Public Comment on Global Warming Solutions Act Implementation
June 2010

Note to the Reader: Comments were submitted in a variety of formats – electronic (generally in PDF or by email) or on paper. MassDEP has scanned all of the comments so they could be converted to Microsoft Word and be incorporated into a single document. In the conversion process, it is possible that the scanner misinterpreted some things, created misspellings, extra spaces and other minor issues. While MassDEP has attempted to find and correct these problems, some probably remain, for which we apologize.

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Stephane Acel-Green

From:	Stephane Acel-Green
To:	"Strategies, Climate (DEP)" <Climate.Strategies@state.ma.us>
Date:	6/4/2010 4:34 PM
Subject:	Attn: Lee Dillard Adams Public comment on GWSA

Thank you for the opportunity to share public comments on the Global Warming Solutions Act. I am heartened by projections that we are on track to reduce greenhouse gas emissions by 18% below 1990 by 2020. I would urge that we exceed this goal and aim for a 25% reduction. Furthermore, reducing our reliance on coal through a more targeted emphasis on efficiency and renewable energy is critical. Not only is coal a very dirty power source, mining for it is dangerous and terrible for the landscape of other states.

I would also endorse the following:

- Preserving healthy, Massachusetts forests. Our state is the 8th most forested in the nation, but we are losing open space daily. We need to do a better job in this area.
- We should be investing more in public transit and non-motorized transportation.
- Let's put a work plan in place now to reach our 80% carbon emission reductions by 2050.
- Promote Massachusetts as a leader of the Green Economy.

Sincerely,

Stephane Acel-Green
29 Carroll Street
Watertown, MA 02472

Mary Ann Babinski

From:	"Babinski, Mary Ann"
To:	"Strategies, Climate (DEP)" <Climate.Strategies@state.ma.us>
Date:	7/15/2010 3:42 PM
Subject:	Public comments on Draft Implementation Plan

I submitted the comment below in June and wish to add an explanation. I live in an area where the city has been going through the process of permitting a gas-fired power plant. This plant is going to pay offsets in the amount of $4,000,000 dollars per year for excess emissions. If the state happily allows this without looking at the area then I have a problem with it. This plant is being proposed for an area in Hampden County where the air quality as a whole is already compromised because it is in the "Pioneer Valley bowl".

The American Lung Association of New England has repeatedly given failing grades to the air quality in Hampden County. In addition to that statistic, this particular area is further stressed by the emissions from the nearby airport which is now home to the larger F-15 jets of the air guard; the Mass pike traffic; and from the diesel truck traffic going to and from several big box distribution centers that have been located here. This truck traffic is going to increase in volume by potentially 500 more truck trips per day due to the expansion of the Home Depot distribution center. And, if the Target distribution center ever goes in, we can expect that number to balloon. Now they want to add a power plant into the mix, practically in the backyard of the schools. Not acceptable as far as I am concerned.

This proposed plant will be emitting 51 tons per year of Particulate Matter, 18 tons per year of Sulfur dioxide, 111 tons per year of nitrogen oxide, 550 tons per year of Carbon monoxide, 29 tons per year of ammonia, 24.8 tons per year of volatile organic matter, 18 tons per year of sulfuric acid mist. Ultra fine particulates, PM 2.5, are a toxic pollutant that is discharged into the air by gas-fired power plants. They will also be delivering, storing and burning fuel oil as an alternative fuel which the project engineer admits will be dirtier.

Ultra fine particulates, PM 2.5, are a toxic pollutant that is discharged into the air by gas-fired power plants. Children are particularly susceptible and no one appears to be taking that into account. The planned location of this plant is in close proximity to several schools, day cares, elderly housing and residential homes. Schools in the neighborhood are approximately 2500 to 3200 feet south east of the power plant site and Westfield high School is about 1 mile south, and the White Oak School is about a 1-1/2 mile to the north. Some residents are within a ¼ mile to a ½ mile from this plant. These centers for children also include day cares and a Head Start facility.

Approving these types of plants to be built in sensitive areas and then allowing them to increase certain emissions because it all appears to look good on paper for the state as a whole is beyond belief. Under

these circumstances and without any conditions applied to these allowable offsets, I cannot be in favor of this. I wholeheartedly agree that we need to cut carbon emissions but let us not be reckless when applying this initiative to the extent that we put some residents in harms way.

If possible, I would like to receive a copy of the final results made.

Respectfully submitted,

Mary Ann Babinski
114 Rogers Ave
Westfield, MA

From: Babinski, Mary Ann
Sent: Tuesday, June 15, 2010 4:57 PM
To: 'climate.strategies@state.ma.us'
Subject: Public comments on Draft Implementation Plan

If I understood the explanation of Cap & Trade correctly, it appears that it will help some environmentally conscientious companies and the neighborhoods that are located near them reap the benefit of cleaner air but put neighborhoods that aren't so lucky to have local governments & companies that are environmentally conscientious at risk. In that case, I am not for it.

Regards,

Mary Ann Babinski
114 Rogers Ave
Westfield, MA

Jonathan Beit-Aharon

From:	Jonathan Beit-Aharon
To:	"Strategies, Climate (DEP)" <Climate.Strategies@state.ma.us>
CC:	Claudette Beit-Aharon
Date:	5/30/2010 8:40 AM
Subject:	Global Warming Solutions Act -- comment

I am delighted with the fact that we (Massachusetts) are taking action, and with most aspects of the act, and wish to make only two comments:

1. Looking at the night sky, I am regularly struck by our horrible light pollution, which prevents us from seeing any but the brightest stars. The elimination of lights in public parks after 11PM, and office buildings when they are not in use, can translate into significant reduction in energy consumption, as well as be beneficial to birds and star-gazer populations.

2. Massachusetts has one of the worst traffic light mis-coordination records I have ever seen. With all the brain powers at MIT and other institutions studying traffic, it is shameful that we force our drivers, commuters and otherwise, to burn fossil fuel while idling at red lights. It is time to relieve our cities and towns of signal coordination, and while certainly giving them input, putting the coordination of speed limits and traffic lights into greater coordination. This has the potential not only to reduce our GHG emissions, but also to improve road safety, economic output, and the quality of life of thousands.

Respectfully submitted by
Jonathan Beit-Aharon
566 Centre Street
Newton, MA 02458

John Clapp, Friends of the Upper Roberts Meadow Reservoir and Dam

From:	Dee Boyle-Clapp
To:	"Strategies, Climate (DEP)" <Climate.Strategies@state.ma.us>
Date:	7/15/2010 10:53 AM
Subject:	Regarding: Global Warming Solutions Act

Regarding: Global Warming Solutions Act

To: Massachusetts Department of Environmental Protection

Attn: Lee Dillard Adams

Letter of support to include local, low impact hydroelectric in the Draft Climate Implementation Plan

I write on behalf of The Friends of the Upper Roberts Meadow Reservoir and Dam, which formed to protect the Upper Roberts Meadow Reservoir and is working to place low-impact micro-hydro power on the dams in Northampton. As potential partners with Co-Act for the attached project, we will be working to raise awareness that our community-owned assets are capable of many things, from creating clean, green, renewable energy to improving the safety of our dams to creating a new and much-needed revenue stream for the City of Northampton. With your help, we can begin the important work to install micro-hydro on our dams.

We fully support an important addition to the Massachusetts Climate Implementation Plan. There are many existing dams in Western MA, including the Upper Roberts and the City of Northampton's additional dams, which combined are capable of providing clean energy and a positive cash flow to the municipalities where they are located.

Everyone we speak with is excited about this and wants this green power. Unlike Cape Wind or placing wind turbines on Mt. Tom, micro-hydro does not change the landscape, but will do what we all want; tap the power that many feel is wasted every minute of the day. Your support will do much to utilize this power source, and we ask for you help in conducting the necessary studies, in streamlining regulations and permitting processes, and installing micro-hydro. We need your help to enable Co-Act, The Friends and other groups to tap our dams so they can generate the power we need now and for decades into the future.

We strongly support the smart development approach proposed by Co-Act and Essex Partnership. (Essex Partnership is advising The Friends regarding only the Upper Roberts Meadow Dam.) Working together to share resources, information, and to provide a centralized base from which we can all learn together, makes sense. Having Co-Act and Essex work in tandem with The Friends and others brings expertise into communities where this is lacking. Our City leaders should not have to become engineers in order to tap their existing assets for power and income. This proposed investment will make a huge impact by providing our Western MA communities with experts who can navigate the system and make micro-hydro possible. This smart hydro approach saves money, it improves our waterways by turning them into

a valued resource, and most importantly, this provides a way to access valuable clean energy that will benefit our community in a variety of important ways.

With the cities in dire straits, and many communities facing removing dams because they no longer produce income and need maintenance we ask that you consider the attached proposal and make it possible to enable us to do the required research to make assets already waiting to be tapped a part of our Commonwealths green energy solution.

Sincerely,
John Clapp
Friends of the Upper Roberts Meadow Reservoir and Dam
www.saveourdam.org

Attachment:
Copy of comment submitted by Paul Deslauriers of Co-Act.

Dee Boyle-Clapp

From:	Diana Boyle
To:	"Strategies, Climate (DEP)" <Climate.Strategies@state.ma.us>
Date:	7/15/2010 11:30 AM
Subject:	Regarding: Global Warming Solutions Act

Regarding: Global Warming Solutions Act

To: Massachusetts Department of Environmental Protection

Attn: Lee Dillard Adams

Letter of support to include local, low impact hydroelectric in the "Draft Climate Implementation Plan"

I am President of The Friends of the Upper Roberts Meadow Reservoir and Dam, which formed to protect the Upper Roberts Meadow Reservoir and is working to place low-impact (fish friendly) micro-hydro power on the dams in Northampton. We fully support an important addition to the Massachusetts Climate Implementation Plan.

There are many existing dams in Western MA, including the Upper Roberts and the City of Northampton's additional dams, which combined are capable of providing clean energy and a positive cash flow to the municipalities where they are located.

As partners with Co-Act for the attached project, we ask to be included in the Global Warming Solutions Act and if supported, will be working to raise awareness that our community-owned assets are capable of many things, from creating clean, green, renewable energy to improving the safety of our dams to creating a new and much-needed revenue stream for the City of Northampton.

The time for using water to power our communities is now. Everyone we speak with is excited about this, and wants this green power. Unlike Cape Wind or turbines on Mt. Tom, micro-hydro does not change the landscape, but will do what we all want; tap the power that many feel is "wasted" every minute of the day. Your support will do much to utilize this power source, and we ask for you help in conducting the necessary studies, in streamlining regulations and permitting processes, and ultimately, installing micro-hydro on our Western MA dams. We need your help to enable Co-Act, The Friends and other groups to tap our dams so they can generate the power we need now and for decades into the future.

We not only support the "smart development" approach proposed by Co-Act and Essex Partnership, we have worked with Essex Partnership who has advised us to do the same process, starting with the Upper Roberts Meadow. Working together with Essex and Co-Act to share resources, information, and to provide a centralized base from which we can all learn together, makes sense. Having Co-Act and Essex

work in tandem with the Friends will bring expertise into communities where this is lacking. Your financial support will make a huge impact by providing our communities with experts who can aid our City Leaders and help them make wise decisions. This "smart hydro" approach saves money, it improves our waterways by turning them into a valued resource, and most importantly, this provides a way to access valuable clean energy that will benefit our community in a variety of important ways. With the cities in dire straits, we ask that you consider the attached proposal and make it possible, or mere pennies when compared to a nuclear plant or a new coal-fired power plant, to enable us to do the required research to make assets already waiting to be tapped, a part of our Commonwealth's green energy solution.

Sincerely,

Dee Boyle-Clapp
President, Friends of the Upper Roberts Meadow Reservoir and Dam

Attachment:
Copy of comment submitted by Paul Deslauriers of Co-Act.

Paula A. Calabrese, Casella Waste Systems, Inc.

25 Greens Hill Lane
Rutland, VT 05701 (802)
775-0325

www.casella.com

July 15, 2010

Ms. Lee Dillard Adams
Massachusetts Department of Environmental Protection Bureau of Waste Prevention
One Winter Street, 6th Floor
Boston, MA 02108

Re: Global Warming Solutions. Act — Public Comments

Dear Ms. Dillard:

Casella appreciates this opportunity to comment as Massachusetts prepares its Implementation Plan for achieving the goals of the Global Warming Solutions Act. At Casella we are deeply committed to reducing our greenhouse gas (GHG) footprint. As a Charter Member of the voluntary EPA Climate Leaders program, we have inventoried our GHG emissions and committed to a voluntary reduction target. Since 2005, we are proud to have reduced the GHG emissions of our Massachusetts operations by over 60%. We applaud the Commonwealth for committing to similarly ambitious reduction efforts.

In establishing a specific emission reduction target within the range of 10-25% for the year 2020, we encourage Massachusetts to commit to reduce statewide emissions to 25% below 1990 levels by 2020. We support this target because it is the most aggressive target allowed under the 2008 GWSA, and because the Advisory Committee's consultants have determined that an even higher 35% reduction is achievable using only low- or no-cost reductions.

Based upon our thorough understanding of GHG emission reduction opportunities for our industry, we encourage Massachusetts to implement the following policies:

1) Incentives / Grants for Natural Gas Vehicles (NGV) and Fueling Infrastructure

Massachusetts should provide incentives or grants for the purchase of new natural gas heavy duty trucks, the retrofit of diesel heavy duty trucks to natural gas, and the construction of natural gas fueling stations. The incentives should require 50% matching and a public access component.

Fueling heavy duty vehicles with natural gas rather than diesel fuel is cleaner in terms of both greenhouse gases and other air emissions. Natural gas pricing also tends to be more stable than diesel fuel. By helping commercial and municipal fleets overcome the barrier of high initial costs for NGV infrastructure, Massachusetts could provide the necessary support to ensure a low GHG and financially resilient transport industry within the state.

2) Public Investment in Recycling Programs

Massachusetts should provide grants to encourage municipalities to transition to single stream recycling. Grants could be applied toward the purchase of large (64- to 90-gallon) recycling containers for residents. Transitioning to single-stream recycling consistently results in increased recycling, which is a proven GHG emission abatement strategy with important ancillary benefits relating to environmental impacts, energy efficiency, economic development, job creation, and immediate financial benefits for municipalities.

In an assessment of GHG reduction opportunities for Massachusetts, the Advisory Committee's consultants have determined that by simply diverting plastics from municipal waste combustion facilities, Massachusetts could reduce in-state CO2e emissions by 0.3 million metric tons per year. According to EPA's September 2006 report *Solid Waste Management and Greenhouse Gases; A Life-Cycle Assessment of Emissions and Sinks,* "Source reduction and recycling (of solid wastes) can reduce GHG emissions at the manufacturing stage, increase forest carbon sequestration, and avoid landfill methane emissions." Thus the GHG benefits of recycling extend beyond state boundaries.

3) State Purchasing Policies — Recycled Content Requirements

Massachusetts should continue to implement and strengthen its green purchasing programs for state departments and agencies. Requiring the procurement of materials with high recycled content helps add strength and resilience to the recycling commodities markets. Recycled content requirements should apply to both traditional materials (such as paper and plastic products) as well as organic materials (such as landscaping products and fertilizers).

4) Continued Support for Residual Biomass Energy Projects

Massachusetts should continue to support renewable energy projects that capture the energy value of residual biomass materials such as agricultural wastes, food processing wastes, and post-consumer food scraps. An important recent report commissioned by the Department of Energy Resources has determined that energy derived from forest biomass is not necessarily carbon neutral on a life-cycle basis. As the state re-evaluates its incentive programs for forest biomass energy projects, it should avoid disrupting funding opportunities for residual biomass energy projects, which tend to have a clearly beneficial GHG impact. Incentives for these types of biomass projects should be strengthened wherever possible.

We thank you again for this opportunity to comment and for Massachusetts' ongoing leadership in this important effort to reduce greenhouse gas emissions.

Very truly yours,
Paula A. Calabrese
Director, Strategic Management

Cc: John W. Casella, Abbie Webb, Karen Flanders, John Farese, Tracy Markham

Miriam Clapp, Lorraine Clapp-O'Keefe, Robert Feuer, Glenn Geiger, Christine Guyette, Krystyna Kurzyca, Wieslaw Orlowski, Francis Thibault, Wayne Thibault, Friends of the Upper Roberts Meadow Reservoir and Dam

To:	"Strategies, Climate (DEP)" <Climate.Strategies@state.ma.us>
Date:	7/14/2010 10:21 PM
Subject:	Ma Climate Implementation Plan

Regarding: Global Warming Solutions Act

To: Massachusetts Department of Environmental Protection

Attn: Lee Dillard Adams

Letter of support to include local, low impact hydroelectric in the "Draft Climate Implementation Plan"

I am writing to support an important addition to the Massachusetts Climate Implementation Plan. There are many existing dams in Western MA that are capable of providing clean energy and a cash flow to the municipalities where they are located. I support the "smart development" approach proposed by Co-Act as it provides a way to access this valuable clean energy source to benefit our community.

Miriam Clapp
888 Chesterfield Rd.
Florence, Ma. 01062

Same email was received from: Lorraine Clapp-O'Keefe, Florence, MA

Robert Feuer, Stockbridge, MA

Glenn Geiger, Great Barrington, MA

Christine Guyette, Leeds, MA

Krystyna Kurzyca

Wieslaw Orlowski, Great Barrington, MA

Francis Thibault

Wayne Thibault, Northhampton, MA

John J. Clarke, Mass Audubon

Legislative Affairs
Six Beacon Street, Suite 1025 A Boston, Massachusetts 02108
tel 617.523.8448 A fax 617.523.4183 A email beaconhill@massaudubon.org

July 15, 2010

Massachusetts Department of Environmental Protection
Bureau of Waste Prevention One Winter Street 6th Floor Boston, MA 02108
Attn: Lee Dillard Adams climate.strategies@state.ma.us

Re: Comments - Commonwealth of Massachusetts Draft Climate Implementation Plan

Dear Ms. Adams;

Mass Audubon commends the Patrick Administration and Massachusetts Legislature for their forward thinking and aggressive policy initiatives addressing greenhouse gas (GHG) emissions and climate change, one of the greatest threats to the nature of Massachusetts. We offer the following comments on the *Draft Climate Change Implementation Plan* that is required by the *Global Warming Solutions Act* (Chapter 298 of the Acts of 2008), including responses to the questions posed in the public review notice on the draft.

Mass Audubon supports a goal of 25 percent or greater reductions in GHG emissions by 2020 compared with the 1990 baseline. We also support the proposed common sense approach of targeting readily available strategies to reduce greenhouse gas emissions. While there are many different ways of measuring cost effectiveness, we recommend that the commonwealth maintain flexibility to utilize a variety of cost/benefit analyses, including McKinsey report recommendations, and adjust strategies as new information and technologies become available.

Furthermore, we recommend that ecosystem service costs and benefits as well as direct costs be considered in the implementation strategy. This is especially important for actions or techniques that affect vital natural resources such as forests. As you know, the commonwealth's forest resources play significant roles in helping offset some GHG emissions and/or in supporting resilience and adaptation of human and natural systems against the existing and unavoidable effects of climate change. For example, we note that in the McKinsey graph, forest management is depicted as a mid-range mitigation strategy in terms of cost effectiveness. However, recent studies indicate that the

carbon storage and ongoing sequestration capacities of forests are most likely maximized by allowing them to develop into older forests without human intervention[1].

Forests in Massachusetts currently sequester nearly 10% of the state's GHG emissions each year (8.6 MMTCO2e sequestration, compared to 94.4 MMTCO2e total emissions[2]). Additionally, 2.2 MMTCO2e are generated annually from land use change. We suggest that avoided deforestation, not specific management practices, be included as a mitigation strategy, as every acre of forest lost represents not only an immediate large release of stored carbon but also a reduction in future sequestration potential. Therefore, reducing deforestation and sprawl through smart growth is important not only to reduce transportation-related emissions but also to retain existing forest carbon storage and ongoing sequestration capacity. Mass Audubon also supports review of the GHG emissions associated with projects involving alteration of more than 50 acres of land, pursuant to the *Massachusetts Environmental Policy Act* (MEPA) GHG policy. We recommend that this policy be strengthened and incorporated into the MEPA regulations.

Regarding the specific questions asked by the Administration, Mass Audubon has the following comments:

2020 Goal:

Where between 18 and 25 percent below 1990 levels should the emissions limit for 2020 be set and why?

Mass Audubon urges the Administration to set a 25 percent or higher goal. The analysis presented with the Draft Plan shows that the Commonwealth is on the path to 19 percent reduction, and that further reductions of up to 35 percent are clearly possible. Threats to human infrastructure and natural systems from climate change are significant, thus the goal should be set as high as is practical to achieve.

We also note that the Draft Plan is very general, and urge development of a more detailed strategy as well as an outreach plan on how to implement reductions. In addition, we suggest that the Commonwealth encourage building long-term momentum for meeting the 40 year goal through an investment in elementary and high-school climate change education, perhaps through a modest investment of Regional Greenhouse Gas Initiative funds.

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[1]This is not to say that we advocate a hands-off management policy for all forests in Massachusetts. Mass Audubon supports a mix of forest reserves and well-managed woodlands, to provide the full range of ecosystem services as described in the Department of Conservation and Recreation's *Forest Vision* report.

[2]Department of Environmental Protection, *Statewide Greenhouse Gas Emissions Level: Final 1990 Baseline & 2020 Business As Usual Projection,* July 2009.

Growing the clean energy economy:

What role can Massachusetts state government play in catalyzing the clean energy economy? What policies could inspire entrepreneurship and create markets for clean energy products and services?

Continued implementation and refinement of policies stemming from the *Green Communities Act* and amendments to the Renewable Portfolio Standard (RPS), including the upcoming regulatory revisions regarding biomass, are instrumental. The past four years has seen significant progress in creating markets for clean energy products and services through the changes to the RPS, implementation of long-term renewable energy contracts, and incentives for solar power generation. We recommend that investments in energy efficiency, conservation, and renewable energy focus primarily on strategies that will achieve maximum reductions at lowest costs including ecosystem service costs. Funds that ratepayers contribute toward GHG reductions should be targeted toward development of a variety of markets and services such as energy efficiency and distributed generation. Seed money for development of innovative approaches and technologies should also be provided. Incentives that help businesses, municipalities, and residents conserve energy while saving money are also important and will be economically beneficial.

Time horizons:

Over what number of years should cost effectiveness of strategies be evaluated in pursuit of the goals of the Commonwealth for 2020 and 2050? How should future costs be compared to present costs?

This is a complex issue that does not lend itself to a simple answer. There are many ways of calculating costs and benefits, including both direct market-based factors as well as the values of ecosystem services. For example, some investments such as development of distributed sources of energy close to where the power will be consumed (such as rooftop solar) may be more costly than other options in the short term, yet yield very high benefits over the longer terms while avoiding impacts to forests and other natural resources that may be associated with other options. The Commonwealth's strategies should include a mix of short and longer range approaches, and methods that minimize impacts to forests and other natural resources while promoting smart growth and sustainable development should be high priorities.

Criteria:

How should the Commonwealth evaluate and prioritize strategies to achieve 2020 and 2050 goals?

Mass Audubon recommends that the Commonwealth develop a more detailed strategy to implement the priority goals identified in the Draft Plan. The strategy should target areas of greatest potential GHG reductions at least cost, where there is political will or political will can be realistically created, the approach is practicable and technologically feasible, and should include aspects that are complementary (e.g. forest protection both mitigates GHG emissions and supports adaptation). We recommend adding avoided deforestation and associated co-benefits to

the priority strategies. Zoning reform and the promotion of cluster and mixed-use development are important. We also recommend that the Commonwealth formally adopt a No Net Loss of Forest carbon policy and implement actions to achieve that goal (see attached draft).

Linkage with Adaptation Planning:

Some GHG reduction strategies are also strategies for adapting to the climate change that is unavoidable. How should these adaptation benefits be valued or prioritized regardless of the cost/benefit?

Large, intact healthy and resilient habitats (e.g. forest cores) are important for adaptation while also sequestering CO2. Large forest blocks and other high quality intact natural systems such as wetlands provides habitat for many species including some of regional responsibility (e.g. forest core songbirds). Smart Growth can help communities adapt to the impacts of climate change by concentrating development in areas likely to be least impacted by climate change while providing adaptation benefits (e.g increase protection for floodplains). Some development techniques such as Low Impact Development have multiple benefits including adaptation benefits (lower energy usage, better water/aquatic habitat protection and management).

In conclusion, Mass Audubon supports the main priorities identified in the Draft Plan. We recommend that avoidance of deforestation be added as an explicit priority; that a more detailed implementation strategy and work plan be developed with additional public input; and that ecosystem service costs and benefits be included when evaluating cost-effectiveness of any particular specific intiative.

Sincerely,

John J. Clarke
Director or Public Policy and Government Relations

Cc:
Phillip Griffiths, Undersecretary for Environment, EEA
Bob O'Connor, Director of Land and Forest Policy, EEA
Encl: No Net Loss of Forest Carbon Policy

DRAFT

Policy to Sustain Massachusetts Forest Carbon Sequestration
(aka No Net Loss of Forest Carbon Policy)

Massachusetts' forests provide a wealth of benefits to the citizens of the Commonwealth: clean and abundant fresh water, wildlife habitat, wood products, recreation and tourism, and quality of life. In addition to these benefits, forests actively remove carbon dioxide from the air as they grow, offsetting approximately 10% of the state's annual greenhouse gas (GHG) emissions and reducing the threat of global warming. Forests also provide critically important green infrastructure needed to help people and nature adapt to a changing climate.

According to the *Statewide Greenhouse Gas Emissions Level: 1990 Baseline and 2020 Business As Usual Projection*, as of 1990, forests in Massachusetts sequestered approximately 8.6 MMTCO2e per year but land conversions resulted in emissions of up to 2.2 MMTCO2e per year. Although the rate of loss has slowed since 1990, conversion of forests to other land uses continues to erode carbon sequestration capacity. When forests are cleared for development, this has both an immediate negative impact by releasing GHG emissions into the air, and a permanent negative impact by eliminating the ability of that land to sequester GHG emissions in the future. At a time when the Commonwealth must find practical and cost-effective ways to reduce GHG emissions, we cannot afford forest losses, as this impedes progress toward meeting targets for reducing the state's carbon footprint. Forest landowners already face a number of challenges to keeping their land in forest, including high development values and low economic returns for forest products. In order to protect the significant climate benefit that Massachusetts' forests provide, we must provide new incentives and requirements to reduce forest loss and maintain our forests' carbon sequestration capacity.

Goal: To reduce emissions from forest loss 50% by 2015 and 100% by 2020 (i.e. achieve "no net loss" of forest carbon sequestration capacity by 2020).

Relationship to Cross-cutting Themes: Reducing the conversion of forests to other land uses and compensating for unavoidable losses by conserving priority forest acreage or planting of trees in urban and suburban areas has additional benefits that relate to the cross-cutting themes established for the CPGEAC subcommittees:

- Market-based approaches to forest protection provide economic incentives to maintain healthy forests and avoid deforestation;
- Smart-growth strategies that revitalize cities and help concentrate jobs and housing contribute to prosperity, productivity, and environmental justice, with opportunities for novel partnerships; Land use policies and strategies that reduce sprawl and forest loss also promote smart, sustainable development patterns that will reduce transportation related energy emissions;
- Retention of natural vegetation on development sites and planting of trees in urban areas reduces heating and cooling related energy emissions while promoting high quality of life, urban air quality and environmental justice; and

- Incentives for forest protection and smart growth help develop sustainable economic growth and transformational business models such as development of the green building industry.

Mechanisms – a preliminary slate of recommended measures for achieving the above-stated goal:

1. Economic Incentives to keep forest as forest.

    a. Buy local wood campaign (certification, tax incentives, preferential purchasing, etc.).

    b. Mitigation funds for forest conservation, restoration and tree planting (jobs in the nursery industry especially in inner cities).

2. Smart Growth Strategies to reduce forest loss and encourage community-oriented development.

    a. Revise state and local land use planning and incentives to encourage density, mixed uses (housing/jobs) and infill development.
    b. Target state infrastructure development and municipal assistance grants to support smart growth and discourage sprawl.
    c. Green Cities Initiative – using a portion of mitigation or adaptation funds for tree planting initiatives in cities and suburbs.
    d. Target funding to implement smart growth approaches with a proven track record in MA

3. Requirements to account for the impacts of forest loss to development.

    a. Clear and simple look-up tables to measure and report emissions and loss of sequestration capacity from deforestation.
    b. Mitigation based on the extent and type of land use change impacts.
    c. A menu of mitigation options, with priority given to actions that contribute to both climate change mitigation and adaptation.

4. Statewide monitoring to track effectiveness of forest-climate policies.

    a. Annual reports of emission reductions from forest sequestration and emissions from land-use change (using conversion and mitigation data provided by municipalities as well as MassGIS data and FIA data).

5. Coordinate mitigation options with Forest-related Adaptation Initiatives

    a. Target forest acres protected as mitigation to those that function in flood attenuation, filter water, or provide forest products that can substitute for more carbon-costly materials or those transported from farther away.
    b. Tree planting in suburbs and cities to reduce heat island effect.

Stephen D. Coan, Department of Fire Services

The Commonwealth of Massachusetts
Executive Office of Public Safety and Security
Department of Fire Services
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DEVAL L. PATRICK
GOVERNOR

TIMOTHY P. MURRAY
LT. GOVERNOR

MARY ELIZABETH HEFFERNAN
SECRETARY

STEPHEN D. COAN
STATE FIRE MARSHAL

Testimony Regarding the Global Warming Solutions Act:

Commonwealth of Massachusetts' Greenhouse Gas Emissions Target and Draft Climate

Implementation Plan for 2020

June 14, 2010

Good afternoon, my name is Timothee Rodrique, I am the Director of the Division of Fire Safety at the Department of Fire Services. I am here today representing the State Fire Marshal, Stephen D. Coan. The reason I am here is to provide testimony to provide this committee with additional information that will assist you in your report on the reduction of Greenhouse gases. During your hard work over the last year, this information was not available. It was released within the last two months, and it is an exciting report that includes fire in the overall reduction of greenhouse gases.

FMGlobal a large commercial property insurance carrier headquarted in Johnston, Rhode Island completed these reports. Their research division is located in Norwood, Massachusetts.

We are all aware of the effectiveness of automatic sprinklers in protecting life safety and property protection, but this report, Environmental Impact of Automatic Fire Sprinklers, is the first of its kind that looks at the effectiveness of automatic fire sprinklers in relation to the overall reduction of greenhouse gases. This takes the effectiveness of automatic sprinklers to a new level. Typically, efforts to improve sustainability and reduce lifecycle carbon emissions are achieved primarily by increasing energy

efficiency and reducing embodied carbon. This research explains a methodology that has been developed to expand the assessment of lifecycle carbon emissions to incorporate risk factors such as fire.

The methodology shows that in all occupancies from residential dwellings, to office buildings, to high hazard facilities the lack of proper risk management and effective fire protection increases the carbon emissions over the lifecycle of the occupancy. Furthermore, typical benefits gained from

" Green" construction and energy efficient appliances can be negated by a single fire event.

FMGlobal studied the results of experiments to quantify the environment impact of automatic fire sprinklers. Large-scale fire tests were conducted using identically constructed and furnished residential living rooms. In one test, fire extinguishment was achieved solely by fire service intervention. In the second test, a single residential fire sprinkler controlled the fire until final extinguishment was completed by the fire service. The report I am submitting provides information on the quantification of the environmental benefit of automatic fire sprinklers comparing two fire tests, including greenhouse gas production, quantity of water required to extinguish the fire, quality of water runoff, potential impact of wastewater runoff on groundwater and surface water and mass of materials requiring disposal.

During the tests, 123 species were analyzed in the air emissions, of which 76 were detected in either of the fire tests. In reviewing the data, the use of automatic sprinklers reduced the greenhouse gas emissions, consisting of carbon dioxide, methane, and nitrous oxide and reported as equivalent mass of carbon dioxide, by over 97%. Further, additional analysis indicates that the reduction of water usage achieved by sprinklers could be as much as 91% when extrapolated.

It is important to note that for new construction in Massachusetts, under the State Building Code, three dwellings units and larger have been required to provide automatic sprinklers and have been since 1997. Later this year, the State Building Code, will be discussing the adoption to include automatic sprinklers in one and two family homes. This seems to be a prudent move as part of your climate change initiative. This is an opportunity to further enhance your work. While this leaves a large stock of buildings that are already built, it is felt that as energy conservation is being directed at new construction, the use of automatic sprinklers should be included to assist in the reduction of greenhouse gases.

A state perspective on this is detailed in our 2008 annual report. In 2008, the Commonwealth of Massachusetts had just over 17,000 building fires, of which just under 6,000 of those fires were in one and two family homes. The FMGlobal report was based on a residential fire. I have included _ a copy of our annual report, if you need additional information I would be glad to provide it.

The second report, " The Influence of Risk Factors on Sustainable Development" talks to a methodology that is developed and applied to expand lifecycle carbon emissions to include the influence of risk factors due to fire and natural disasters. While I won' t take further time to go into the details of this report, it is important to note they both fire and natural disasters are shown to present risk factors that are important potential sources of carbon emissions. Without effective fire protection systems or in areas exposed to natural hazards such as wind, there is an increased risk of carbon emissions by 1 to 2 percent.

I am submitting two copies of each report, and my talking points. At this time, I wish to thank the committee for their time and invitation to speak today. My contact information is provided in the event brochure, if you have further questions.

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Adam Cohen

From: Adam Cohen
Sent: Thursday, July 15, 2010 2:10 PM
To: climate.strategies@state.ma.us
Subject: RE: Regarding: Global Warming Solutions Act

Please add my voice to Mr. Clapp's. This is an initiative the state can be proud of.

Regards,
Adam Cohen
Northampton, MA

Attachment:
Copy of comment submitted by Paul Deslauriers of Co-Act.

Bill Davis, Ze-gen, Inc.

1380 Soldiers Field Road| Second Floor |
Boston, MA 02135 **phone**: 617.674.2443 |

June 14, 2010

Secretary Ian Bowles
Executive Office of Energy and
Environmental Affairs
100 Cambridge Street,
Suite 900
Boston, MA 02114

Dear Secretary Bowles:

Thank you for giving me the opportunity to speak to you today and comment on the proposed range for the 2020 greenhouse gas emissions limit and draft implementing plan under the Global Warming Solutions Act. My name is Bill Davis and I am the founder and CEO of Ze-gen, a Boston-based renewable energy company developing advanced gasification technology that converts organic waste material to energy using a new high-temperature gasification technology. Our company is on the forefront of developing new and innovative solutions that help find beneficial use for waste that would otherwise be disposed of in a landfill or incinerator. Ze-gen's technology has the potential to significantly reduce greenhouse gas emissions by producing energy from waste biomass, diverting this waste from landfill disposal, and averting methane emissions from landfills, the largest anthropogenic source of methane in the United States. It is for that reason that I speak to you today.

Ze-gen is a Massachusetts based company employing 28 people in Boston and New Bedford and has been in business since 2005. We are supported by the Massachusetts Renewable Energy Trust, the MTDC, and private investors, and are a source of true innovation in advanced gasification and in creating new solutions for one of the World's greatest issues – pollution and greenhouse gas emissions from landfills. The Global Warming Solutions Act is designed to reduce energy costs to ratepayers, expand clean energy jobs, attract clean energy businesses, increase the state's energy independence and reduce greenhouse gas emissions. This act makes Massachusetts one of the first states with a comprehensive plan to address climate change. I applaud the forward thinking and strong conviction of Governor Patrick and the Legislature to take meaningful steps toward addressing the climate change challenges we face by setting clear goals for greenhouse gas reductions by 2020 and 2050.

My comments today focus on the draft implementation plan for meeting these goals. Energy Supply is one of the major sources identified in the Global Warming Solutions Act for potential GHG emissions reductions in the Commonwealth and a major tool for driving those reductions is the Renewable Portfolio Standard (RPS). The RPS requires Massachusetts electricity sellers to obtain specific percentages of their electricity from renewable sources that demonstrate lifecycle greenhouse gas reductions. Energy from biomass is a central component of the RPS and achieving a target of 18 – 25% reduction in overall greenhouse gas emissions will require a shift away from fossil fuel generation to sources of electricity that reduce incremental greenhouse gas emissions.

Ze-gen is focused on the subset of biomass that is truly an untapped opportunity for greenhouse gas reductions – waste biomass that would otherwise go to landfill. Perhaps different from the discussion on using virgin wood material for energy production that has been met with some controversy lately, Ze-gen is finding ways to recover energy from waste wood that has already been harvested, already used in useful products, and is now at the end of its useful life. Producing energy from waste materials like waste biomass that would otherwise produce significant levels of methane emissions from decomposition in landfills is a critical area of opportunity for emissions reductions that must be highlighted. Methane is over 20 times more potent than CO2 as a greenhouse gas so any effort to reduce it yields tremendous benefits.

Waste is a global problem. 4 billion tons of waste is generated each year around the world, with 2.6 billion tons of it sent to landfills. Furthermore, rapid increases in population and urbanization in developing countries are resulting in increases in landfilled waste and public health risks. But waste is not just a problem abroad; it is a problem in Massachusetts as well. Massachusetts generates over 12 million tons of waste per year and sends it to regional landfills both near and far every day, sometimes as far away as Virginia and South Carolina. The one-way flow of materials from extraction, processing, and consumption to disposal directly contributes to climate change.

Massachusetts has a role to play in the development of a clean energy economy and state government and state policy on climate change can create incentives and signals in the marketplace that catalyze new businesses and create markets for clean energy products and services. With regards to energy supply, it is critical that the Commonwealth remain consistent in its policy towards biomass as a renewable resource. Established norms and policy precedent considers biomass to be a carbon-neutral resource, and especially waste biomass that would otherwise decompose and rot. In fact, current state law, RPS regulations across the United States, Federal laws, and international policies including the UN Framework on Climate Change and the European Union Landfill Directive all support treatment of biomass as renewable. A radical change to that policy would put Massachusetts outside the norm and discourage development of innovative biomass technologies in the Commonwealth, stifle innovation, and make it harder for companies like Ze-gen to thrive in Massachusetts.

Instead, the Commonwealth should consider extending its leadership position on the environment by focusing policy initiatives on reducing greenhouse gas emissions from landfills through clear policy directives that dissuade landfill dumping and encourage technologies that create new beneficial uses for waste. By doing so, the state can meet its goals of reducing greenhouse gas emissions while also

encouraging innovation that leads to new companies, new jobs, and new industries thriving in Massachusetts.

Sincerely,

Bill Davis

President & CEO Ze-gen, Inc

Paul Deslauriers, Berkshire Co-Act

Berkshire Co-Act Community Organizing for Action

Local Low Impact Hydroelectric:

Proposed Addition to the Draft Climate Implementation Plan

Massachusetts has made impressive strides in greenhouse gas (GHG) reductions. The scope of considerations is broad in the implementation plan but does not include the fruitful option Co-Act has been working on for the past year, utilizing existing Massachusetts dams. Our proposal for one watershed in Central and Southern Berkshire County can generate over one hundred million dollars of revenue to local municipalities over the life of the project. Our proposal includes two additional watersheds in Western Massachusetts.

Harnessed water power supplied energy to most of Massachusetts industry well into the early 1900's and is the reason why most Massachusetts towns are located along rivers. A romantic notion during this time of unprecedented oil pollution is to refurbish our region's "initial power grid". It is a timely program which will yield cost effective reductions in GHG.

Co-Act is proposing a unique process of collaboration and system development that can once again make small, low impact hydroelectric a feasible, attractive, and reliable source of renewable energy. This process results in channeling the generated proceeds back into the municipalities in which the dams are located. Revitalizing appropriate, established hydroelectric facilities will provide a positive cash flow for communities, and for those towns with larger dams, provide significant income for generations to come. This is a form of economic development for underserved communities while increasing our energy independence.

On November 6 of 2009, Co-Act facilitated the first hydroelectric symposium of its kind in the country focused on Central and Southern Berkshire County. This meeting of environmental, regulatory, engineering, and funding professionals, along with owners and managers of facilities, made for an informative exchange. By the conclusion of the panel discussion, we had identified a cost effective, efficient, watershed approach to put dams in our region back 'on line', generating hydroelectric power.

We first applied our strategy by conducting a preliminary assessment of 11 low impact hydro projects in the Housatonic Basin, located in Berkshire County. Since then, we are investigating another 8 dams in Pioneer Valley which can provide similar benefits to their municipalities. We propose these 19 dams, capable of generating $1.6 million/ yearly in revenues, plus an additional 6 dams located in Western MA, be selected for a pilot program to demonstrate the effectiveness of our watershed approach.

The approach we have developed can be applied state wide. It involves all the stakeholders identifying criteria for dam selection and "smart development". For example, the criteria we gathered from our meetings for the Housatonic include: minimal water diversion, structural integrity, potential improvements to the fish and wildlife habitat, and recreational use development. Once the smart development dams are selected Co-Act will expedite the permitting process with our team from Essex Partnership, an engineering firm specializing in low impact hydro. Essex will also assist with the engineering analyses to provide a reference design for dams in the same watershed to help reduce construction costs. We will realize further cost savings by clustering data gathering, environmental studies and inspection of the facilities.

Revitalization of existing dams and tapping appropriate run of the river sites requires a unique collaboration and due diligence that our assembled team is well qualified to perform. Licensing and approval for small hydroelectric plants typically costs several hundred thousand dollars and take four years or more. Co-Act's new approach can cut the time required to less than two years and greatly reduce costs. Our goal is a 50% reduction in time and pre-installation costs, compared to existing standards. This makes small hydro power feasible throughout Massachusetts while opening up the model for a clean energy economy throughout the United States.

Rising Dam

Another advantage of our approach is that it allows us access to dam "barriers" on a stretch of river to increase and improved portage, recreational use, and safety. It also provides the benefit of an improved power transmission from distributed generation which will support the power grid at many points.

Citing one example from our preliminary assessment, the Rising Dam on the Housatonic can produce $500,000 per year. Generators are built to last for one hundred years, as compared to photovoltaic panels which lasts for only 20 years. Presently, this energy is being wasted, as it is for most of the dams in our region.

Co-Act is seeking partnership with the Commonwealth of Massachusetts to initiate the first of three phases to harness this energy. This first phase involves the screening and analysis of 25 dams in three regions in Western MA. We have already begun work on two regions and propose to include a third high yield region. Our team will research and gather available data on each dam and conduct a site visit to confirm hydraulic data, take measurements, and develop more accurate energy calculations. We will initiate meetings with owners of the dams and the town officials for their initial approval. We will provide initial estimates for repair, refurbishing, site preparation, and design. Our team will assess the dam for "smart development" criteria. At the conclusion of the first phase, we will provide preliminary cost estimates for equipment purchase and installation as well as return on investment calculations for each of the 25 low impact hydro electric dams.

With identified hydroelectric assets, we will approach "The Renewable Energy Trust" to increase their portfolio of MA renewable energy generation. For the 25 dam pilot project we are seeking $150,000 for this phase of the work, or $6,000 per dam from the state.

The second phase would involve detailed structural and engineering analysis for each site, and permit application completion. The third phase involves the purchase and installation of equipment. These last two phases would involve funding from additional sources including the Renewable Energy Trust, local banks, and other institutions such as DEP. Cost estimates depend upon each site and are part of the first phase.

We will also need the state's support in streamlining the permitting process that will result in higher dam safety, system engineering analysis, retention of historic dams and important habitats, a healthier environment and improved recreational use. State officials are needed to support this watershed development for municipal power generation as it involves contiguous municipalities. State representatives can provide important insights and valuable networking to make this project a reality as Senator Ben Downing is currently doing with our team.

As a next step, Co-Act would like to make a more formal presentation and have a detailed discussion with the Executive Office of Energy and Environment Affairs, Mass DEP and optimally Governor Patrick. This is not only about clean energy; it's also about accessing our common wealth for the good of the community. It's progressive, green, and grassroots oriented.

I appreciate having the opportunity to share our research, approach, and vision. I look forward to hearing about having a more in-depth meeting.

Sincerely;
Paul Deslauriers

Executive Director
Co-Act
413-232-7888
Paul@Co-Act.org

Richard Dimino, A Better City

33 Broad Street I Suite 300 I Boston, MA 02109 Tel: 617-502-6240 I Fax: 617-502-6236

WWW ABETTERC TY ORG

July 23, 2010

Ms. Lee Dillard Adams
Massachusetts Department of Environmental Protection Bureau of Waste Prevention
One Winter Street, Sixth Floor
Boston, Massachusetts 02108

Re: Draft State Climate Implementation Plan

Dear Ms. Adams:

We are pleased to comment on the Commonwealth's Draft Climate Implementation Plan. We are encouraged to see that the Commonwealth is in the forefront of-addressing issues of climate change which will have major implications for future generations. Decisions that we collectively make today will have major implications for the environment, the economy, and the quality of life for all of our citizens for years to come. That situation plaoes the burden on this generation of choosing wisely and carrying out our commitments for the benefit of our children and.their *children.*

As a member of Mayor Menino's Climate Leadership Task Force, A Better City had the pleasure in assisting the City of Boston in the development of recommendations for their own Climate Action Plan, which has set a goal of reducing Greenhouse gas emissions 20% by 2020 and 80% by 2050. EOEEA Secretary Bowles has stated his intention to set a 2020 emissions reduction requirement of 18 to 25 percent below 1990 levels, which is commendable and we encourage the state to sets its goal in the 20-25% reduction range.

While ABC has not conducted a detailed technical analysis of the proposed greenhouse gas reduction emission standards, we can state with certainty that to achieve high goals, we need to aggressively implement a broad range of reduction measures that touch on the three major sources of GHG emissions in Massachusetts — power generation, buildings, and transportation, while balancing the implications of these steps against the economic and quality of life aspirations of current and future residents of the state.

Mobile source emissions from transportation account for roughly 28% of GHG emissions in Massachusetts, and are the fastest growing source of emissions nationally since 1990. While some reductions in transportation related GHG emissions will be achieved through federally mandated fuel efficiency standards, this will not be enough and the Commonwealth must aggressively look at maximizing its public transit systems to decrease vehicle miles traveled (VMT), which are projected to grow 20% by 2025 (Transportation Finance in Massachusetts: An Unsustainable System, March 28, 2007):

In "Moving Forward: Transportation and the Massachusetts Economy" a recent report from Our Transportation Future, several key findings highlight the importance of investing in our transportation system that are central to The discussion in how investments in our transportation system must be made if the state is to achieve any goal of reducing GHG emissions and improving the overall environment in Massachusetts. Among these are:

- The MBTA faces a $2.7 billion repair backlog just to maintain a state of good repair
- In the Boston metro area, over 58% of all peak-hour VMTs are now in congested traffic. This translates to 91 million peron-hours of additional delay and an extra 61 million gallons of fuel consumed annually.
- Annual cost of congestion is increasing dramatically throughout the state, equaling $940 million in Boston and $77 million in Springfield.

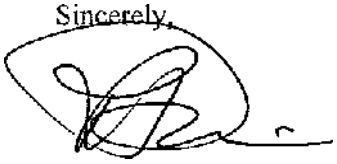
We strongly encourage the state to include the investment in state of good repair maintenance and continued expansion of transit systems throughout the Commonwealth as a significant tool in reducing VMT. Expeditiously implementing projects such as the Silver Line Phase III, the Urban Ring, and projects of the State Implementation Plan such as the Fairmount Line improvements and the Green Line Extension will enable the Commonwealth to provide the necessary transportation system to move increasing numbers of individuals throughout the state. These expanded systems come with the added benefit of supporting closer, "smart growth" developments that encourage the use of public transit, biking, and walking, which all have a positive impact on emission and VMT reductions.

Transportation agencies, planning boards, and regulatory agencies can be expected to do only so much. Residents, businesses, and institutions will also need education, motivation, and incentives to choose to live and/or locate in more compact and energy efficient communities and buildings, choose more efficient vehicles and modes, consume products, and use services that support rather than inhibit achievement of ambitious climate change goals. To do so these groups will need to be a part of the process in selecting the choices and we encourage the Commonwealth to work with organizations like A Better City to do so.

We look forward to working with the Commonwealth as it develops its Climate Implementation Plan that will ultimately benefit all residents, businesses, and institutions, and put Massachusetts on the right track to significantly reduce its GHG emissions.

Please feel free to contact David Straus, Director of TDM & SuStainability at A Better City, 617-502-6246 or dstraus@abettercity.org with any questions regarding our comments.

Sincerely,



Richard A Dimino
President and CEO

David Dow, Sierra Club – Cape Cod & the Islands Group

From: David Dow

To: "Strategies, Climate (DEP)" <Climate.Strategies@state.ma.us>

CC: David Dow

Date: 6/15/2010 11:01 AM

Subject: Global Warming Solutions Act Mitigation Plan Comments

Global Warming Solutions Act Mitigation Plan Testimony: June 15, 2010

As Chair of the Cape Cod & the Islands Group- Sierra Club, I wanted to focus on aspects of the "Mitigation Plan" at the local level. The Massachusetts Chapter- Sierra Club written comments will focus on a state-wide perspective. One of the major challenges facing grassroots activists is how to make the transition to sustainability in a cost effective fashion to address challenges such climate change (mitigation and adaptation); solid and liquid waste management; protection of our public water supply; conservation of wildlife in terrestrial and aquatic habitats; improving our public transportation infrastructure; restoring our local agriculture base and becoming more self sufficient in our food supply; etc.

Unfortunately most of the federal/state legislative mandates and the accompanying regulatory regimes of the management agencies focus on very specific issues: agriculture, protecting public water supplies, wastewater management, municipal solid waste management, renewable energy development, fisheries management, etc. This narrow regulatory focus makes it difficult to address broad issues such as the mitigation/adapatation strategies required to address climate change which is already impacting Cape Cod. Climate change has impacted our socioeconomic system as residents struggle to purchase homeowners insurance in the private market, with those able to purchase private insurance facing 5-10% wind deductibles on their policies. There are changes in our natural system as well as marine populations shift in distribution/abundance in response to water temperature changes; changes in the migratory patterns of birds; alteration in the phenology of land plants; increased damage from Northeasters; etc.

Cape Cod towns face major unfunded mandates to upgrade our wastewater infrastructure in order to reduce nitrogen loading to our coastal embayments which are impacting water quality and key habitats such as eelgrass beds. Many towns are choosing sewering and construction of advanced, centralized wastewater treatment plants as the response to this challenge. Pumping water from the coast to inland treatment plants via sewers will require a lot of energy which would be expensive given the price of electricity here. Towns will need to develop community wind turbines to meet this energy requirement like they are doing for the Superfund cleanup at the Massa. Military Reservation. The treated effluent will be discharged back into

our sole source aquifer and is likely to contain low levels of the emerging contaminants of concern (CECs) which were described in the recent report from the Silent Spring Institute. The SSI study described the cec levels in the zones of contribution of nine drinking water wells on Cape Cod. The sludge will have to be dewatered and treated as a municipal solid waste or utilized in anaerobic digestors to produce energy from the methane gas. This sludge may contain non-water soluble CECs.

Cape Cod towns face another unfunded mandate when the SEMASS waste-to-energy incineration contract expires in 2015 and the tipping fees triple in cost. Moving towards a zero waste philosophy for msw (composting for organic wastes; promoting greater recycling; source reduction; extended producer responsibility; etc.) would be a cost effective way to reduce greenhouse emissions on Cape Cod. Moving towards ZW would reduce greenhouse gases more than the waste-to-energy approach and increase private sector jobs at the local level (compared to off-Cape wte plants). Energy audits and better insulation in our homes/installation of CFLs for lighting is another low hanging fruit strategy to increase the efficiency of energy use.

At the local level we need to find away to address all of these challenges in an integrated fashion that is affordable to the tax payers and uses public investments to create private sector jobs here on Cape Cod. The Massa. Executive Office of Energy & Environmental Affairs Mitigation Plan doesn't present a mechanism to address these local challenges with an integrated solution that leverages local investments/state loans to address the multitude of pressing problems that we face. This problem is exacerbated by the multiple local/state planning, permitting and regulatory entities that address narrow aspects of the overall problems that we face in making the transition to sustainability. We need to develop a new way to address these multiple challenges at the state level and enhance the capacity of Cape Cod towns to implement these solutions.

Submitted By: David Dow; Chair, Cape Cod & the Islands Group- Sierra Club; 18 Treetop Lane; East Falmouth, Ma. 02536-4814; phone: 508-540-7142; email:ddow420@comcast.net

Maureen Doyle	
From:	Maureen Doyle
To:	"Strategies, Climate (DEP)" <Climate.Strategies@state.ma.us>
Date:	6/9/2010 7:32 PM
Subject:	Global Climate Change public meetings comment

I attended the Global Climate Change public meeting in Worcester, MA on June 3rd, 2010. Thank you for the opportunity to listen and participate in the plan. I appreciated hearing the comments and insights of the individuals who spoke (both DEP members and audience members). I have to say that i think the proposed goal of "18-25% of 1990 levels by 2020" is too little too late. I noted that DEP has a goal of 80% of 1990 levels by 2050- THAT should be the 2020 goal!! It's a goal- we need to aim high!! Someone said, "MA will be affected by global climate change". EVERYONE will be affected by global climate change so our goal needs to be higher.

This is not just a passing environmental condition that we are preparing for- global climate change is big!! This has happened on earth before and the species that were on the earth at the time did not survive. We need to make serious changes to affect the global climate changes- not a measly 18% change!!

Thank you for your time. There is a great group in Worcester MA that has wonderful energy and solutions (local and global) to the impending crisis. Check out summersolutions.org for ideas and their contact info.

Maureen Doyle
771 Lebanon Hill Rd.
Southbridge, MA 01550

Pamela Faggert, Dominion Resource Services, Inc.

By Electronic Delivery
elimate.strategies@state.ma.us
July 15, 2010

Ms. Lee Dillard Adams
Massachusetts Department of Environmental Protection
Bureau of Waste Prevention
One Winter Street, 6^{6} Floor
Boston, MA 02108

Re: **Comments of Dominion Energy New England, Inc. on the Massachusetts Global Warming Solutions Act Draft Implementation Plan and Proposed Reduction Target for 2020**

Dear Ms. Dillard Adams:

Dominion Resources Services, Inc. ("Dominion") is taking the opportunity to submit comments to the Massachusetts Department of Environmental Protection ("the Department") relative to the Massachusetts Global Warming Solutions Act ("MA GWSA" or "the Act") Draft Implementation Plan and Proposed Reduction Target for 2020. Dominion's subsidiaries, Dominion Energy Salem Harbor, LLC (Salem) and Dominion Energy Brayton Point, LLC (Brayton), own and operate generating facilities in Massachusetts. Another subsidiary, Dominion Retail operates as an energy supplier in Massachusetts. Dominion supports a single multi-sector national program to address greenhouse gases. However, if Massachusetts continues to forward with its own state program, we offer the following comments.

Proposed reduction Target for 2020

In the draft MA GWSA Implementation plan, the Massachusetts Secretary of the EOEEA stated his intention to set a 2020 Massachusetts emissions reduction requirement of 18 to 25 percent below 1990 levels and to consider achieving this target only through those measurements that show potential for significant energy cost savings and/or job creation. Analyses done to date estimate that, by 2020, Massachusetts' GHG emissions would be reduced to about 77 MMTCO2e, which is nearly **19% below 1990 levels** (roughly 94 MMTCO2e) with what's on the books today (Regional Greenhouse Gas Initiative (RGGI), Renewable Portfolio Standards (RPS), etc.). Since there is a predicted 19% reduction expected from what is on the books and on the way, we believe that the Massachusetts 2020 reduction target should not go beyond these already identified measures which fulfills the requirements of the 2020 plan.

Implementation Plan

A consultant team working for EOEEA has identified significant areas for potential reduction in each of the sectors of the Massachusetts economy that produce significant GHG emissions. These projections were based on assumptions about future economic activity, demographic changes, and the cost and availability of technology. The analysis suggests three major areas of opportunity:

- Transportation
- Buildings
- Energy Supply

The most applicable of the three listed above to Dominion electric generation operations in Massachusetts and to Dominion Retail operations in Massachusetts is Energy Supply. Three principle Energy Supply areas that the Draft Implementation Plan mentions are:

1. Fuels—existing and anticipated policies:

- Adoption of the 2007 federal Renewable Fuel Standard and the eleven Northeast and Mid-Atlantic states' Low Carbon Fuel Standard (LCFS) under development,

2. Electricity – existing and anticipated policies:

- Use of the Renewable Portfolio Standard to require Massachusetts electricity sellers to obtain specific percentages of their electricity from renewable sources with demonstrable lifecycle GHG reductions (taking into account biomass GHG reductions),

- Increasing imports of low-carbon electricity, through **proposed expansion** of transmission lines that could import Canadian wind and/or hydroelectric energy.

3. Electricity– identified additional cost-effective potential:

- Additional electricity imports of low-carbon electricity, through **additional expansion** of transmission lines that could import Canadian wind and/or hydroelectric energy.

The potential for cost-effective reductions of GHG emissions from these sectors has not been evaluated for the draft GWSA Implementation Plan. To the extent that an analysis of their potential is completed over the next several months, the potential reductions from these sectors may also be included in the implementation plan to be released by January 1, 2011. Dominion requests that any further analysis for the GWSA

Implementation Plan be presented for public comment prior to finalizing the plan in January 2011.

Dominion would like to thank the Administration for holding several stakeholder meetings during the month of June. Contrary to what was expressed by several stakeholders in those meetings, Dominion does

not support the RGGI states reducing the cap level and does not support retirement of allowances that do not sell for the auction reserve price. Market certainty and price stability are key aspects of RGGI' s success to date. Finally, some stakeholders in the June MA GWSA meetings advocated that states push for federal climate legislation which allows for a cap level adjustment mechanism to reduce the cap level if emissions — and thus prices — are much lower than anticipated including an auction reserve price with allowance retirement. Dominion does not support federal greenhouse gas legislation with floating cap mechanisms and unpredictable allowance retirement volumes. Changing policy mechanisms and caps mid-way though the RGGI program implementation or as part of a future federal program coupled with multiple federal regulatory actions which are expected to be promulgated over the next several years exacerbates market uncertainty, could lead to electric pricing increases and could potentially affect electric reliability in the Northeast and Mid-Atlantic region.

If the states decide that RGGI is to be linked to other developing regional cap and trade programs, Dominion asks that the RGGI states conduct a market and policy analysis via a stakeholder process with the opportunity for stakeholder input, prior to implementing any RGGI program linking policy mechanisms.

Thank you again for this opportunity to comment on the MA GWSA Implementation Plan and 2020 reduction target. If you have any questions, please call Paula Hamel at 401-457-9234 or e-mail at paula.a.hamel@dom.corn.

Sincerely,

Pamela F. Faggert
Vice President and Chief Environmental Officer

Cc:

Laurie Burt, Commissioner
J. Colman, Assistant Commissioner, Bureau of Waste Prevention
N. Seidman, Deputy Assistant Commissioner for Climate Strategies
D. Weekley, Dominion

Jeff Gang	
From:	Jeff Gang
To:	"Strategies, Climate (DEP)" <Climate.Strategies@state.ma.us>
Date:	7/15/2010 4:56 PM
Subject:	Jeff Gang: Comments on Draft Climate Implementation Plan

For submission:

I'm a recent graduate of Amherst College, a lifelong Massachusetts citizen, an Eagle Scout, and now a resident of Cambridge. I've spent the past year volunteering as the Western Mass. Co-Coordinator of Students for a Just and Stable Future, a grassroots student group working to inspire change toward a clean energy future.

I spent summer '09 with a group of my peers traveling by bike across Southeastern Massachusetts, sleeping in volunteers' homes and church basements, holding events, going door-to-door, and working with community groups around the issue of climate change. My time with Massachusetts Climate Summer was a joy, a constant struggle, and a lot of fun.

The most important thing I learned, going door-to-door in Falmouth, Yarmouth, Hyannis, Barnstable, Wareham, Bridgewater, Brockton, Braintree, Hull, and Jamaica Plain, was this: people in Massachusetts understand that we need to change the way we generate our power. They understand that strip-mining and burning coal is not a long-run solution, that gasoline they rely on every day is not healthy, that there are better ways to power our lifestyles.

There are many reasons to support a high target for emissions reductions. For me, the scientific calls for 80% reductions across the globe by 2020 are enough – and the developed nations of the world must lead the way with even more aggressive cuts. For others, it's to catalyze Massachusetts' clean energy economy, or to avoid climate change that could destabilize the world, or to stop importing billions of dollars' worth of coal and oil from nations hostile to America, or because generals, the CIA, and the Quadrennial Defense Review advise us to do so.

What I learned last summer, though, is that for most Massachusetts citizens - at least, the somewhat-random sample of those whose doors I knocked on - the reasons don't matter any more. There is consensus that the high-carbon lifestyle needs to change, and swiftly.

If Massachusetts is truly to embrace our role - as part of a developed nation that has immensely profited from using fossil fuel in the past; as a state that historically has led the way in responding to threats to morality and justice; as a group of citizens who refuse to let political inertia determine their trajectory - we need a much stronger goal. Massachusetts needs to be carbon-neutral as soon as possible, but more importantly, we need to take a leadership stance that is morally in line with the global consequences.

Does Massachusetts wish to be marginally on the right side of history, or a bold leader whose decisions sparked a sea change?

Please choose the highest possible reduction target and immediately pursue a stronger one. We'll back you up.

Sincerely,

Jeff Gang

Robert Garrity, Massachusetts Climate Action Network

Massachusetts Climate Action Network

P.O. Box 51563
Boston, MA 02205
(617) 515-0600
www.massclimateaction.net

July 15, 2010

Massachusetts Department of
Environmental Protection
Bureau of Waste Prevention
One Winter Street 6th Floor
Boston, MA 02108

Attn: Lee Dillard Adams

Dear Ms. Adams,

On behalf of the Massachusetts Climate Action Network, please accept these comments regarding the Draft Implementation Plan.

The Massachusetts Climate Action Network is a statewide organization that supports the work of local climate activists across the Commonwealth. We currently have 40 chapters which operate in over 70 communities throughout Massachusetts. Since 1999 MCAN has helped local leaders develop climate action plans, undertake personal carbon reduction efforts, and educate the general public about climate change.

MCAN members were critical supporters of the Global Warming Solutions Act when it was passed by the Legislature and signed by the Governor in 2008. Our local members believe that while climate change is a threat that must be addressed on the national and international levels, Massachusetts can play an important leadership role and provide important examples which show the way for federal climate action.

This organization strongly supports the actions of the state government with respect to climate change. The last three years have seen significant progress through legislative and administrative actions to address energy efficiency, renewable energy, and carbon reduction. We look forward to working with, and supporting the work of, the state with respect to climate change related policies. We would like to express our thanks to the Administration and the Committee charged with developing this Draft Implementation Plan for their very evident hard work in creating this report.

Regarding the Draft Implementation Plan 2020 Goal.

The Massachusetts climate action network strongly recommends that the state adopt the statutory maximum target of 25% reduction below 1990 levels by 2020. We believe this level of reduction is not only necessary but entirely possible. Given the global nature of the crisis, and the contribution of sources in Massachusetts to that global crisis, it is our strong opinion that the Massachusetts GWSA target is important not only as an environmental protection mechanism, but equally or more so as a precedent and exemplar for future action by other states and governments.

Furthermore, the strongly believe the state should reassess 25% limit and consider whether the statute needs to be updated to reflect current scientific thinking regarding greenhouse gas levels in the atmosphere. The most current scientific evidence would suggest that a 25% reduction below 1990 levels by 2020 target is inadequate to reduce atmospheric greenhouse gas levels below the current level of 380 ppm. Furthermore a growing number of climate scientists believe that a 400 to 450 ppm target is "inadequate to sustain the integrity of global climate and to hold the risk of ruinous climate change to an acceptably low level."

Another reason to set the target as high as possible is that compared with other parts of the country Massachusetts has a head start on carbon reduction as we have a much smaller reliance on coal than other regions and we already have much more advanced energy efficiency programs than other parts of the country. We have already begun many of the processes which will reduce CO2 emissions, and the entire New England region has seen a shift to a service economy which has a naturally lower carbon profile than the manufacturing economies in other parts of the country. The point is while carbon reduction may be difficult here, it will be relatively easier than in many other parts of the nation. This alone argues for as deep a cut as practical in Massachusetts to supplement weaker efforts in other parts of the country.

Massachusetts is also on the vanguard of states with respect to carbon reduction targets. Just as the Global Warming Solutions Act was partly based on, and driven by, California's so-called AB32 legislation, future state actions will be based on, and driven by, what we do here in Massachusetts. We have a responsibility as a climate policy leader and high technology state to set the highest possible targets as an example to the states which follow us.

MCAN's position with respect to our greenhouse gas reduction goals are that they should be aspirational; they should be difficult to reach and appear beyond our grasp. It is far better that we should fail to reach a difficult but meaningful goal, than to reach an attainable but insufficient one.

Regarding the Strategies Discussed in the Draft Implementation Plan

The strategies presented in the Draft Plan, and in the accompanying report, "Cost-Effective Greenhouse Gas Mitigation in Massachusetts: An Analysis of 2020 Potential" by the Eastern Research Group, cover a wide range of activities, both underway and planned.

The report identifies potential reductions in excess of 18% when considering only those efforts already envisioned and underway. To get to 25%, and beyond to the 80% required by 2050, Massachusetts will need to consider new strategies and technologies beyond the "usual suspects" discussed in the ERG report

Particularly, MCAN would suggest that "community mobilization" that engages citizens in behavioral reductions as well as installed measures must be investigated. For the past four years MCAN has been working toward residential carbon reductions from efficiency, but also from

conservation, transportation and solid waste. These categories of reduction rely heavily on behavioral changes that address the way people go about their day to day activities and are hard to capture with traditional efficiency deliver methods.

Our experience with the "Low Carbon Diet" has show reductions of nine to nineteen percent as community average. While part of these reductions are energy efficiency related, many are resulting from lifestyle changes which require training and behavior modification.

We are all familiar with "Jevon's Paradox" which states that as efficiency increases, so does consumption. This is particularly true in a society such as modern America where increased efficiency of appliances and lighting struggle to keep up with the proliferation of energy-using technologies, from larger televisions to dramatically increased computer usage, for instance. Clearly, energy efficiency is an important factor in carbon reduction, but we believe a focus on conservation requires discrete and significant treatment.

We would also note that there are several additional areas flagged for follow-up in the reports, including agriculture and drinking water conservation. Our experience with our 40 chapters indicates a growing interest in "community supported agriculture" and "near food." The local food movement supports local agriculture as a multiple bottom-line benefit, from reductions in carbon due to transportation energy expenditures to taste and quality of food.

Clean water use has a tremendous climate impact due to the energy required to pump, treat, heat, and treat after use. Water conservation has a tremendous energy impact benefits, as a number of studies done, particularly in western states, have shown. We encourage the administration to include water conservation measures in the final implementation plan.

In closing, MCAN strongly supports the multi-pronged approach begun with this draft. As the McKinsey graph shows, there are a great number of strategies and opportunities we need to investigate to achieve our climate protection goals. Climate Change was caused by an innumerable number of sources, it will only be solved by an innumerable number of approaches.

Robert Garrity
Executive Director

Nancy Goodman, Environmental League of Massachusetts

July 13, 2010

Ms. Lee Dillard-Adams
Massachusetts Department of Environmental Protection
Bureau of Waste Prevention
One Winter Street, 6th Floor
Boston, MA T02108

Re: Comments on Commonwealth's Draft Climate Implementation Plan

Dear Ms. Dillard-Adams:

Thank you for the opportunity to comment on the Draft Climate Implementation Plan and also for the Commonwealth's very good work to date on related issues including the Manomet biomass report, the excellent work with MassDot on the GreenDot program, and the Forest Vision work which may have implications for climate change. We also applaud all the good work on efficiency that is ongoing.

Given the analysis by the state's consultant team which concludes that with current and anticipated policies Massachusetts will get close to 19% GHG reductions below 1990 levels, we urge the administration to adopt a **25% reduction** target by 2020 -- this will set us well on the path to achieving the 80% by 2050 target and Massachusetts will again lead the nation by adopting an ambitious but achievable target.

In terms of the framework, we look forward to the next iteration and much more specificity in terms of recommended policies that will get us to our target. While we understand the need to initially look at no and low cost policiy solutions -- to get to the 2050 target we believe all policies that will get us significant reductions should be on the table for consideration.

There are, however, several low and no cost policies that we urge be included in the next draft -- several of these are policies that promote smart growth. These would include:

Zoning reform: For the first time, zoning reform legislation recently was reported out favorably by the Joint Committee on Municipalities and Regional Government. This legislation would update our outdated zoning laws and give municipalities additional tools and incentives to once again be able to recreate the kinds of New England villages for which we are known.

Planning: There has been no financial support for planning by communities for some time -- we understand that now is not the best time to propose any new spending, but we believe some support for

planning, be it for municipal plans or for corridor planning -- similar to what we have devoted to the South Coast Rail project -- could help us achieve more concentrated development in certain locations – making transit feasible and better protecting natural resources, including water supply.

As important, would be for the state to *align all its spending decisions with its own sustainable development principles* -- casinos built on greenfields is an example of misalignment. The GreenDot program goes some way towards this goal. In the pending zoning reform legislation, we ask communities that get additional controls/tools to also adopt low impact development (LID) bylaws, yet we have not yet seen the state do the same. *All state projects or state funded projects should be using LID approaches*. While the relationship between LID and climate change may not be immediately apparent, we believe ensuring that our natural resources are healthy and resilient is critical as we experience the impacts of climate change and need to adapt accordingly. Additionally, LID can help the state and municipalities avoid energy use and costs related to treatment and moving water around the state.

Also related would be *additional funding for transit oriented development (TOD)*. There had been dedicated funding for TOD projects several years ago along with a program coordinator. A relatively small amount of funding made available for TOD projects could incentivize good developments.

In the transportation arena, we urge inclusion of *pay-as-you drive insurance* and some type of *"feebate" program* that would send a signal to consumers that buying more efficient vehicles is a better and more cost-effective choice. *Congestion pricing* and other technologies that could promote reduced Vehicle Miles Travelled should also be included in the plan. We also support a *gas tax* as a way to change behaviors and travel choices and to provide a badly needed revenue stream for transportation projects with an emphasis on transit.

Finally, we urge consideration of some resources being allocated for *consumer awareness and public education* about the value and need for these policies.

Again, thank you for the opportunity to comment and we look forward to working with you as the plan develops.

Sincerely,

Nancy Goodman
Vice President for Policy
Environmental League of Massachusetts
14 Beacon Street, Suite 714
Boston, MA 02108
(617) 742-2553
Fax: (617) 742-9656

Stephen Greene

Stephen Greene
181 Market St Unit 21
Lowell, MA 01852

July 15, 2010

Lee Dillard Adams
Manager, Global Warming Solutions Act Implementation
MassDEP, One Winter Street, Boston MA 02108

RE: Support Letter for Global Warming Solution Act Policy Actions

Dear Ms. Dillard Adams,

I am writing as a private citizen who had the opportunity to testify at the Public Hearing on June 7, 2010 in Lowell, MA. I now offer this written summary of my points.

I agree with and supports a 20% GHG reduction goal for 2020. I support GHG reduction efforts in the five basic areas:

1) Work on Transportation related GHG reductions. Some ways to achieve this are-Smart growth
    - Encouraging LEED Neighborhood development
    - Expanding Public Transportation
    - Develop innovative shared car use programs

2) Improve Buildings:
    - Energy efficiency through weather stripping to reduce infiltration and add/ improve insulation in buildings
    - Use new technology to monitor and maintain air quality to avoid past problems with poor indoor air quality and excess moisture with tight buildings
    - Improved windows in old buildings
    - Use energy efficiency and weather stripping work as way to train and employ people
    - Provide incentives for improving building lighting, appliances and HVAC energy efficiency.

- Improved building codes
- Improve compliance with building codes.

3) Waste Management
   - Reduce the generation of waste and the impacts of the materials wasted Divert more disposed materials though recycling improvement
   - Modify the language of the waste bans to make enforcement easier at the point of waste generation.
   - Assure proper management of Hg from end of life energy efficient CFL bulbs an(any subsequent technologies

4) Industry
   - Apply smart growth principles to businesses
   - Smart clustering of business facilities for better efficiency and shared resources Cogeneration for greater energy efficiency - consider district heating.
   - Look into new ways to achieve the work objective. (Get beyond doing somethinE efficiently that should not be done or should be done completely differently).

5) Cross cutting
   - Use incentives (negative and positive) to promote efficiency and sustainability Develop education and awareness programs the empower the citizens of Massachusetts to act in the interest of improving our sustainability objectives Examine policies and programs holistically, understanding where tradeoffs are being made.
   - Review programs and regulations routinely to account for new information or technology.

I appreciate the opportunity to **comment. In full disclosure, I am also a** member of the Lowell Green Building Commission.

Should you have any questions, please contact me (Stephen Greene greenesh@comcast.net).

Sincerely

Kimbal Hall, Alden Research Laboratory, Inc.	
From:	Kimbal Hall <khall@aldenlab.com>
To:	"Strategies, Climate (DEP)" <Climate.Strategies@state.ma.us>
Date:	6/8/2010 10:51 AM
Subject:	Global Warming Solutions Act

Hello,

I am writing to request that the Global Warming Solutions Act (GWSA) be modified to include benefits towards installation of geothermal (ground source) heat pumps. This is a form of renewable energy that may not be as glamorous as wind or solar, but it is every bit as important to reducing greenhouse gas emissions, not to mention national energy independence.

By using the solar energy stored in the ground, geothermal heat pumps can use as little as 20% of the energy of a typical heating system (electric resistance, oil, natural gas), which greatly reduces the greenhouse gas emissions of the heating system. It also results in less pollution from oil burning furnaces, like black carbon, which also contributes to global warming. Instead, the emissions come from power plants, which have much stricter, better regulated, and better monitored pollution requirements. The contribution of heating homes is a large fraction of our contribution global warming, especially in the colder climates present in Massachusetts.

Ground source heat pumps use a proven technology (refrigeration) that use a lot of solar energy, and a little electricity to provide a clean, domestically supplied way of heating homes. More people should be educated about their benefits, they are a key tool in reducing global warming, and they should be included in the GWSA.

Thank you for your consideration,

-Kimbal.

Kimbal Hall, PE
Senior Engineer
ALDEN Solving flow problems since 1894
Alden Research Laboratory, Inc.
30 Shrewsbury St., Holden, MA 01520-1843
Phone: (508) 829-6000 ext. 6486
Fax: (508) 829-5939
www.aldenlab.com

Sarah Hamilton, Medical Academic and Scientific Community Organization, Inc.

Medical Academic and Scientific Community Organization
375 Longwood Avenue / Boston, MA 02215-5328
Tel: 617-632-2310 Fax: 617-632-2759

July 15, 2010

Massachusetts Department of Environmental Protection
Bureau of Waste Prevention One Winter Street,
6th Floor Boston, MA 02108
Attn: Lee Dillard Adams

RE: Draft State Climate Implementation Plan Dear Ms. Adams:

MASCO is a non-profit member organization which provides services to 23 institutions in the Longwood Medical and Academic Area (LMA) of Boston. The LMA has over 43,000 employees and 19,200 students, as well as serves over 2.2 million patients annually. As a community largely made up of health care and academic institutions, cultural and religious organizations, we care about a clean and healthy environment and have been working voluntarily to reduce greenhouse gas emissions. We applaud the Commonwealth's national leadership in formulating public policy to affect climate change and reduce greenhouse gas emissions.

Through the Global Warming Solutions Act goals of 18-25% reductions by 2020 were established. In support of the development of the State Climate Implementation plan your recent consultant evaluations indicate the potential to go even further to achieve 35% reductions by 2020. During your recent public hearing process, you asked for public comments on this idea.

We suggest that goals of 25% by 2020 over 1990 levels remain the maximum considered in the implementation plan for the following reasons:

- The City of Boston has adopted a goal of 25% from 1990 levels by 2020. It would be helpful for regulatory policies to be in alignment between the City of Boston, the Commonwealth's largest city, and the State.

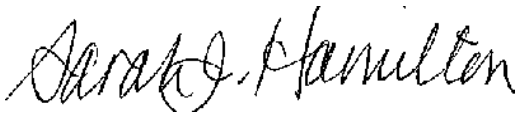
- The Eastern Research Group evaluations show that the state is on track, with policies established since 2007, to achieve levels of 19%. Twenty-five percent will still be a stretch for many sectors.

The transportation emission reduction goals in the plan seem to be based on assumptions that: a minimum of 60% of future development will all be done in accordance with smart growth principles (i.e., more dense "mixed use development supported by high quality public transit infrastructure based on adoption of zoning and planning standards by 75% of local communities"); transportation projects will be prioritized to "support denser smart growth development, promote increased public transit ridership, walking and bicycling"; and overall vehicle miles travelled (VMT) reductions will be achieved (through national vehicle efficiency improvements, changes in the carbon content of fuel, and changes in driving practices).

While worthy as goals, translation into achievable implementation plans by 2020 may be quite difficult. With transportation projected to account for more than one-third of the State's total emissions, significant additional funding needs to be put in place to support the level of investment needed in new public transportation service expansion projects which would enable significant greenhouse gas emissions reductions from the transportation sector in the future. An example of an expansion project is the Urban Ring which would provide service to the densely developed LMA, which is struggling for service by an overcapacity Green Line. We recognize that the Commonwealth's ability to fund such new projects is hampered by the current economic climate, cost and revenue issues at the MBTA, and a serious Federal and State transportation funding crisis, issues which MassDOT under the Patrick Administration is hard at work to address. However resolution is still far in the future, and will be done in part through the regional transportation planning process next year.

Finally, additional specificity on the basis for reductions and cost savings in the plan related to refrigerants would be helpful for industrial and commercial consumers prior to setting emission goals and promulgation of regulations.

Thank you for your consideration. Sincerely,



Sarah J. Hamilton

Vice President,

Area Planning and Development

Alan Hanscom

From: Alan Hanscom

To: "Strategies, Climate (DEP)" <Climate.Strategies@state.ma.us>

Date: 6/23/2010 8:50 AM

Subject: my comments that I gave last night at the Tobin Center in Roxbury, in an email

There are many people who DO care about these issues, partly because of the awareness raised by the accident in the Gulf, but mostly because concern about the environment has been growing for a number of years now. They may not be here tonight, but people live busy lives and it's not because they don't care that there aren't more of them here. We are here tonight to represent EVERYONE who cares for the environment, from those who don't have time to voice their feelings to those who are afraid to fight corporate power with their words and testimony.

In response to the question, "Where between 18 and 25 percent below 1990 levels should the emissions limit for 2020 be set and why?" I feel we should go for the 25% reduction ... but in no way be limited by it. Rather, we should be highly motivated to exceed that, perhaps even going for 40 or 50 percent.

A previous speaker mentioned how we should not limit ourselves to only going after the "low-lying fruit" -- the easy things that will help us achieve these reductions ... but also after the things that will require some work. I agree with that, and in particular, we should change some things that require investment, perhaps even large ones. One of them is getting rid of coal for power generation in Massachusetts, and another is making the rail system attractive to ride on again.

I live in Salem, Mass., and Dominion's coal-burning power plant sits right on the ocean's edge. Why not have offshore wind turbines sending electricity in via cable to the connection to the grid that is already there? Why not use wave power technology offshore as well, and add that to the mix? Additionally, if the power plant was replaced with "green" structures that have solar panels and energy efficiency (and just a thought here ... the current smokestacks wouldn't even have to be torn down, they could be covered with solar panels!), the site would be transformed from a major greenhouse gas emitter to one that emits none ... AND generates clean electricity. Additionally, manufacturing of wind, solar, and other renewable energy products could take place there in a light manufacturing plant and be shipped all over the world, since Salem Harbor currently has a federally dredged channel that allows large ships to come in (at present it's just used to offload coal).

Also, investment in our rail system in particular could achieve spectacular greenhouse gas reductions. I ride the train to work every day, and I hear the complaints about how the lack of improvements in the system has turned a lot of riders off, and sent them back to commuting by car. These complaints range

from railroad cars that aren't clean, dirty restrooms, mechanical breakdowns that cause people to be late for work, the public threats by the MBCR to cut evening and weekend service, and even the fact that they won't even print schedules for riders anymore. Also, train stations should be destinations people look forward to waiting in, not leaking Quonset huts like the one in Salem is.

Alan Hanscom
82 Washington Square East
#2
Salem, MA 01970
(978) 985-1572
direct to voicemail (978) 666-4493

Nancy Hazard

July 15, 2010

To: Ian Bowles, Secretary, EOEEA
climate.strategies@state.ma.us

From: Nancy Hazard
30 Spring Terrace, Greenfield, MA 01301
nhazard@WorldSustain.net
Former Director, Northeast Sustainable Energy Association (NESEA) & Tour de Sol

RE: Global Warming Solutions Act: Comments on 2020 Goals

My Background: I have been working in the sustainable energy field and promoting solutions to the climate change crisis for over 40 years as a builder; director of the Tour de Sol, America's Green Car Competition and Festival; director of the Northeast Sustainable Energy Association; and a major player in the *Greening Greenfield* campaign, in Greenfield, MA.

Thank you for this opportunity to comment on the four questions you have posed.

1. Where between 18 and 25 percent below 1990 levels should the emissions limit for 2020 be set and why?

We should be aiming for 25% reductions for the following reasons:

- Scientific reports indicate that the earth is near the tipping point of runaway climate change, which would end life as we know it on planet earth.
- I am pleased to read that MA is on track to reduce GHG 18% below 1990 levels by 2020. GREAT WORK! But we can - and must do more.
- I have read the excellent MA Plan and Eastern Research Group's report.
- I am familiar with the McKinsey report. It is excellent, and I am glad that MA is using their research.
- The above report and analysis show that reductions of 35% are technically possible by 2020. While I realize that market penetration is incredibly difficult, I believe that setting the bar high is the best way to convey the urgency, and spark action in the citizens of the Commonwealth, inspire other states to take similar bold actions, to inspire the US government to take action, and to inspire other nations to take action. As you know, climate change mitigation efforts are only effective if everyone on the globe takes action.
- Reducing energy use has HUGE economic benefits. When doing an audit of energy use in 2008 in Greenfield, a community of 18,666, we found two stunning facts:
    - We spent $86 million on energy in 2008 for heating, lighting, transportation, and industrial and commercial use.
    - Of that $67 million left our community to purchase oil, gas, and electricity. Only 22% stayed in the community to pay for infrastructure - wires and pipes - billing and customer service.

Growing the clean energy economy:
2. What role can Massachusetts state government play in catalyzing the clean energy economy? What policies could inspire entrepreneurship and create markets for clean energy products and services?

Energy use in Greenfield, and likely other communities in the Commonwealth are divided equally between:

- Residential heating, lighting and cooling
- Transportation
- Commercial and industrial.

Given my expertise in transportation and residential buildings, I will focus on these two areas. First I would say that I agree with Amory Lovins and others. Avoiding energy use, is the most cost effective approach. It is not sexy, but it is effective and necessary, and we can cut our energy use by at least 75% and likely more. Today, on a per capita basis, Europe uses half the energy we use, and Switzerland, for one, has the goal of cutting their energy use by 80%. This is incredibly inspiring to me! If they can do it, so can we.

- **Transportation:** Changing behavior (and get people out of cars and planes) is incredibly difficult, which is why I spent 18 years trying to demonstrate that more fuel efficient vehicles - vehicles that potentially emit ZERO carbon emissions - are possible! (e.g. electric vehicles recharged with locally produced, zero carbon, renewable energy.) Vehicle efficiency and vehicle GHG emissions, however can only be mandated by the Feds. So there are several things that MA can do.
    - Ask its citizens to live near work and play to cut VMT, and use the most fuel efficient mode of transportation or vehicle type for their needs. This will CREATE DEMAND for more fuel efficient vehicles, as well as mass transit, bikeways, and walkways.
    - Continue to invest in mass transit, bikeways and bike parking facilities, walkways etc.
    - Let the Feds know that you want even higher CAFÉ standards. 35mpg is good. But we know we can do better. Several sedans on the market get 50 mpg, and the Automotive X-Prize is challenging the industry to deliver 100 mpg cars.
    - Continue investing in and incentivizing locally produced, non-toxic, zero carbon, renewable energy - as you know, this is the clean energy economy growth opportunity.

- **Residential buildings**: This is where the Commonwealth can have the greatest impact - and the greatest clean energy economy growth opportunity. I have been fussing with my 1600 square foot cement block house for 30 years. My neighbor, with the same house, uses almost FIVE times as much energy as I do. My home now uses 26 BTUs/sq ft /yr. Another 200 year old home in the area uses 22 BTUs/sqft/yr. So that is my benchmark of "what is possible." The average home in this area uses 70 BTUs/sq ft /yr, and my neighbor uses 126 BTUs/sq ft /yr. So you can see the potential. IT COST $ TO MAKE OUR HOMES MORE ENERGY EFFICIENT - BUT THE PROCESS ALSO CREATES JOBS!

  The science of reducing energy use in buildings has made great progress over the past 30 years - so we know how to do this - and it creates jobs. MA has one of the most progressive utility programs, and there is quite a lot of money for lower income homeowners, renters and landlords. BUT there are three problems 1) Most people do not know about these opportunities, or cannot believe that they really exist; 2) the amounts of $ are still inadequate to make the deep changes

that we really need; and 3) the present systems in place to analyze energy retrofit opportunities are too costly and time consuming, and the funds available may not fit the need.
I would like to make the following recommendations:

1) The Commonwealth should raise the level of urgency state-wide and add your weight to the outreach and marketing efforts of Mass Save, and the many agencies to assist lower income people on a statewide basis, and support LOCAL efforts (see local below for more.)
2) The PACE financing scheme would be helpful in increasing the amount of funds available to do energy retrofits. There are likely others - I'm not an economist.
3) Making energy retrofits deeper and more cost effective: This is a bit complicated and has several steps. I would like to urge the Commonwealth look at using the BTU/sqft/yr metric to inexpensively assess the efficiency of existing buildings, set a standard (goal) of where you want to get the building, and then allocate funds that would enable that building to be retrofitted to that level.
   Many people will likely feel that this idea is an invasion of privacy, but if the state made it possible for some neutral entity to have access to energy use information for each home, the BTU/sqft/yr could be calculated in 20 minutes or less with no need to actually go to the home. This would quickly identify the homes that need work, and the owners could be contacted directly with information about potential energy savings and programs to capture those savings customized for their building.
   Visiting a building ONCE and retrofitting it to a reasonable level at that time is more cost effective than returning again and again and adding bits and pieces. Having said this, there could be a two-step process. Take the building to 40 BTU/sqft/yr NOW, and then, when energy is a lot more expensive, and when the siding needs to be replaced, have a program that helps the owner add exterior insulation while redoing the siding, and possibly upgrade windows and doors at the same time, with the goal of getting to 25 BTU/sqft/yr.
   In Greenfield, last year 2.5% of the residences received energy retrofits. If we could double that rate to 5%, and aim for the 40BTU/sqft/yr standard, by 2030, 100% of the homes would be at that standard. If we then focused on the next standard, by 2050 100% of the residences would be at 25BTU/sqft/yr - which, I believe, could be met by locally-produced, non-toxic, zero carbon energy.

LOCAL Efforts: Community-based programs are absolutely essential in getting people to take action. Greenfield, for example, has the highest request rate for audits and energy retrofits from Mass Save than any other town in WMECO's territory, and that is because of our efforts through the *Greening Greenfield* campaign, and our inexpensive and innovative *10% Challenge*. When a citizen takes the challenge, they receive a FREE lawn sign. The sign generates pride in those 'doing the right thing,' raises the visibility of the program, and we believe it will help make 'doing the right thing the norm.'

We have found, however, that after people have agreed to take action it is not all smooth sailing! In fact, getting through the Mass Save and/or Community Action process is daunting, and it requires handholding by friends and neighbors. A campaign like *Greening Greenfield* is not very expensive, but it does have some expenses such as the lawn signs etc., and having one paid 'sustainability coordinator' in the Town is incredibly helpful.

Citizen groups need more support - from the state. As an active citizen, I do not yet get the feeling that there is a group effort to achieve a common goal, in spite of all the fabulous legislation that has been passed. For example, a few months ago, I went to a CT conference and felt this amazing feeling of a group effort. It was held by the CT DEP. They offer lots of services to citizens working in their communities. They have an amazing web site

www.ctclimatechange.com where progress is tracked using easy to understand maps, along with lots of resources. At the conference the DEP Commissioner participated for a full day with the goal of hearing about community needs, her staff shared what the DEP is offering, and community organizers shared their experiences using various tools etc.

$$: Then there is the natty gritty financial needs for smallish amounts of money to run a local campaign - ideally staffed primarily by volunteers. The Green Communities Act $ is great, but Greenfield's request to use some of the $ for a sustainability coordinator was seen as an "admin" job and did not fit within the 10% allowable for admin. So our need is still unmet.

A few ideas: 1) The state could offer mini-grants directly to citizen groups themselves or through a group such as the Massachusetts Climate Action Network. 2) While more complicated than I would like, the EOEEA could reinstate the Clean Energy Choice program, which offered matching money to towns when citizens chose to pay a premium for "clean energy." This matching money incentivized me and others in Greening Greenfield to encourage residents to invest in clean energy and send the message that they want clean energy, and for us to receive the $ we needed to carry out our volunteer-driven efforts. Given the tight economic times, whether this would still work is debatable, but it does have many merits, and enabled us, and the clean energy industry, a small but steady source of income.

Time horizons:
3. Over what number of years should cost effectiveness of strategies be evaluated in pursuit of the goals of the Commonwealth for 2020 and 2050? How should future costs be compared to present costs?
Criteria:
4. How should the Commonwealth evaluate and prioritize strategies to achieve 2020 and 2050 goals

As noted above, I believe it would be MORE cost effective when energy retrofitting a home to aim for a specific performance standard, and then bit the bullet and just go for it. It would be interesting to see economic analysis of this approach.

Linkage with Adaptation Planning:
5. Some GHG reduction strategies are also strategies for adapting to the climate change that is unavoidable. How should these adaptation benefits be valued or prioritized regardless of the cost/benefit?

This is a very interesting question. The insurance industry are experts on this. It would be interesting to see what they would have to say about $$ for disaster preparedness. Clearly flooding and severe storms are already costing the Commonwealth hundreds of millions of dollars.

Thank you for this opportunity. If you would like to discuss any of these ideas in greater depth, please contact me at nhazard@WorldSustain.net.

David Herships, Friends of the Upper Roberts Meadow Reservoir and Dam

David Herships
22 Warburton Way
Northampton, MA 01060
413-584-0180

July 15, 2010

To: Massachusetts Department of Environmental Protection

Attn: Lee Dillard Adams

Regarding: Global Warming Solutions Act

I am writing to support adding a provision for low-impact hydro power to the Massachusetts Climate Implementation Plan.

There are over 2,0000 dams in dams in Western MA, many of which can generate clean, renewable energy if small-scale hydro power is installed. This will provide cash flow to the cash-starved municipalities where they are located as well as make them more energy-independent.

I support the "smart development" approach proposed by Co-Act as it provides a way to access this valuable clean energy source to benefit our community.

Thank you,

David Herships

Dr. Martin Hertzberg

Sent: Monday, May 31, 2010 12:08 PM
To: Strategies, Climate (DEP)
Subject: Stop makiing fools of yourselves!

To Whom It May Concern:

Attached for the record are copies of my papers and articles dealing with the issue of global warming/climate change caused by human emission of so-called "greenhouse gases". It amazes me that your state and Congressman Markey continue to make fools of themselves on this issue. The whole issue is a fraudulent concoction of the cabal of IPCC-Gore-Hansen propagandists. I strongly urge you to invite Prof. Richard Lindzen of MIT to testify. He knows more about this subject than anyone else in the world. There are real environmental problems such as the current Gulf oil spill and many others. Do you really have to waste your scarce resources chasing this fictitious phantom?

There, now I have done my civic duty. Do yours and finally bury this idiocy!

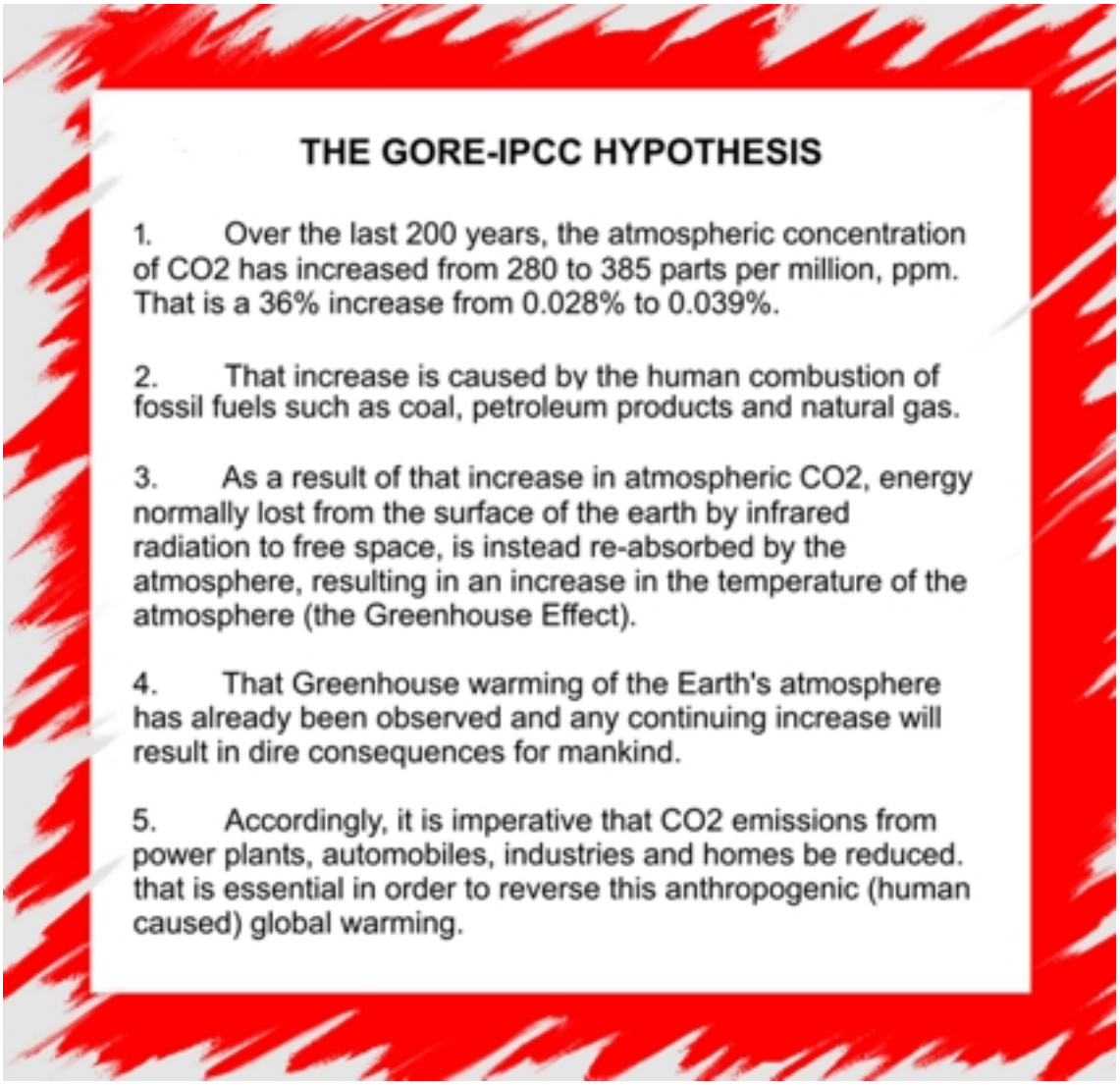
Sincerely,
Dr. Martin Hertzberg
Copper Mountain, CO 80443
www.explosionexpert.com

The Lynching of Carbon Dioxide -

The Innocent Source of Life

by Dr. Martin Hertzberg

Al Gore and the International Panel for Climate Change (the **IPCC**) have for years presented the public with this argument:



Now Al Gore, the IPCC, and the vast majority of politicians in the US and Europe argue that this is all established science. But I am here to show that not only is this not established science, but that the objective evidence available indicates that it is false.

Shocking isn't it? You might ask, how can a lifelong Democrat like myself reject my party's position on global warming and join the camp of the skeptics, virtually all of whom are Republicans or neo-cons.

So, I'll tell you how it all started for me.

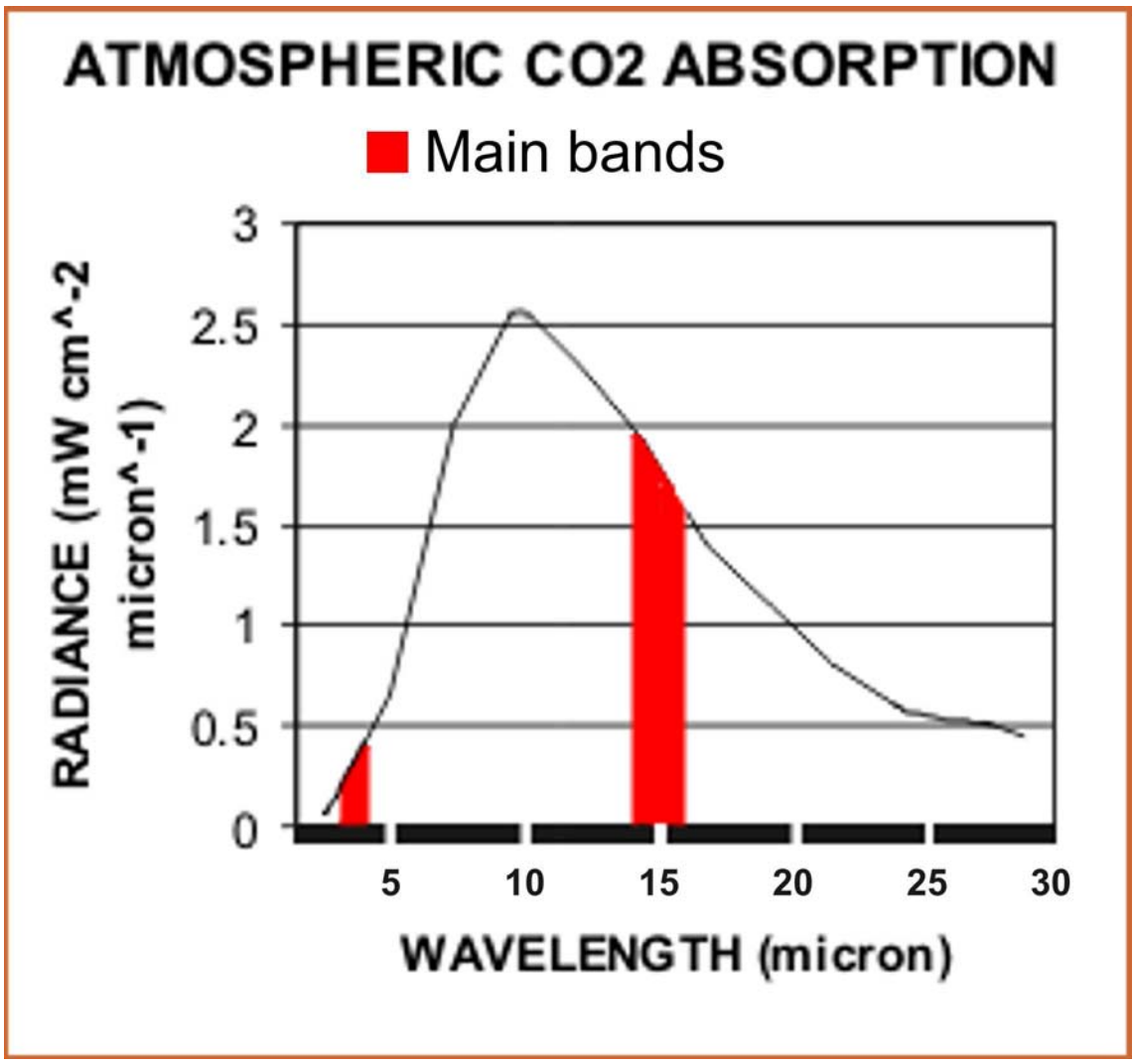
My involvement in this issue of global warming started in 1986 at a NATO-sponsored meeting on coal combustion that was held in the French Alps. A colleague from MIT, actually solicited my opinion on the subject of global warming.

Now, just being asked for an opinion by someone from MIT is a great honor. I had given a paper at a Combustion Symposium at MIT in which I had used the infrared emissions from CO2 to measure explosion temperatures, so I was familiar with its spectrum, and he knew that I had once been a meteorologist, so he solicited my opinion.

Shortly thereafter, a colleague from New Zealand, who had worked in our lab while on his sabbatical, wrote to me about the subject, and we proceeded to collaborate on a study of the problem.

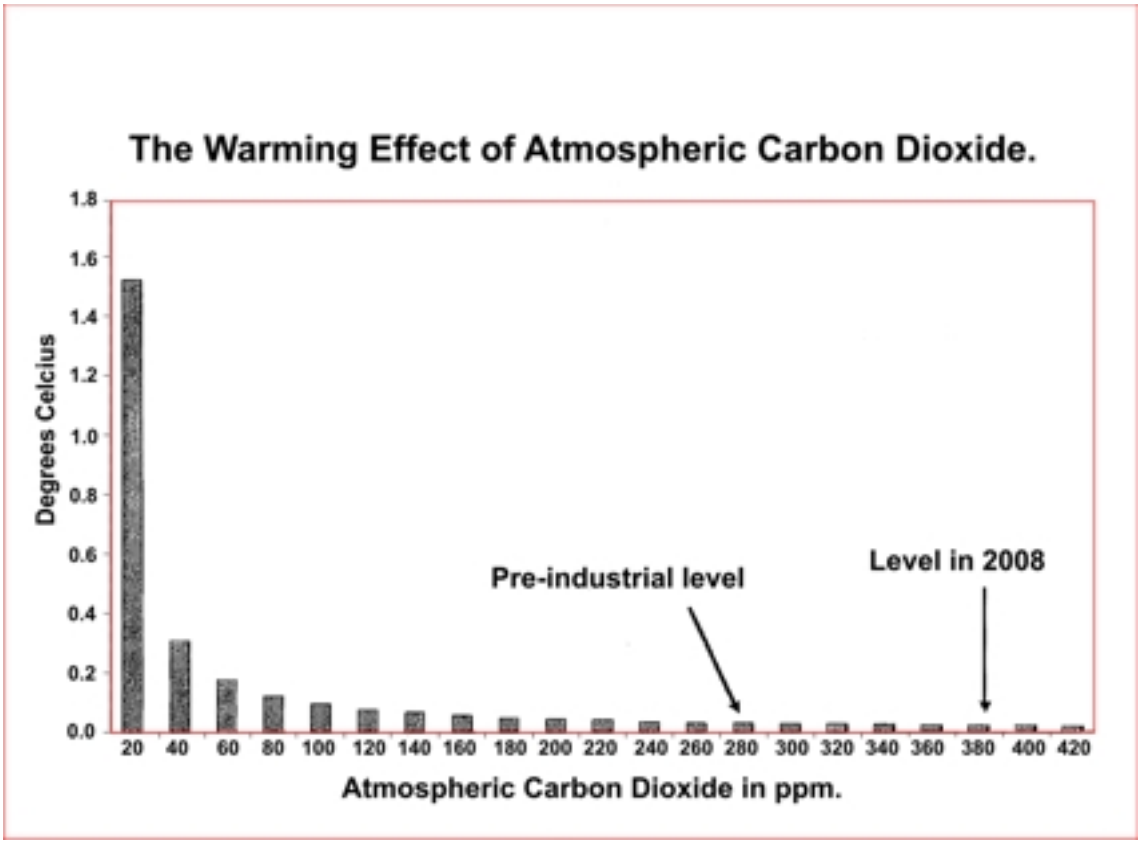
We confined our attention to item 3 of the Gore-IPCC argument which dealt with the infrared absorption of atmospheric CO2 and the atmospheric heating that would result. In 1994, I presented our paper at a Symposium in Irvine, California.

Let us look at the atmospheric absorption spectrum of CO2.



This plot shows the approximate spectrum of the infrared heat radiated to free space from the surface of the earth at the earth's average temperature. It represents the maximum possible heat loss that would balance the heat gained from the sun. Plotted on the graph are the narrow absorption bands of atmospheric CO2 that would represent its "greenhouse effect". They are at 4.3 and 15 microns. I used the 4.3 micron band for my measurements of gas temperatures. The bands are narrow and confined and at most they can absorb only a few percent of the total energy under this curve.

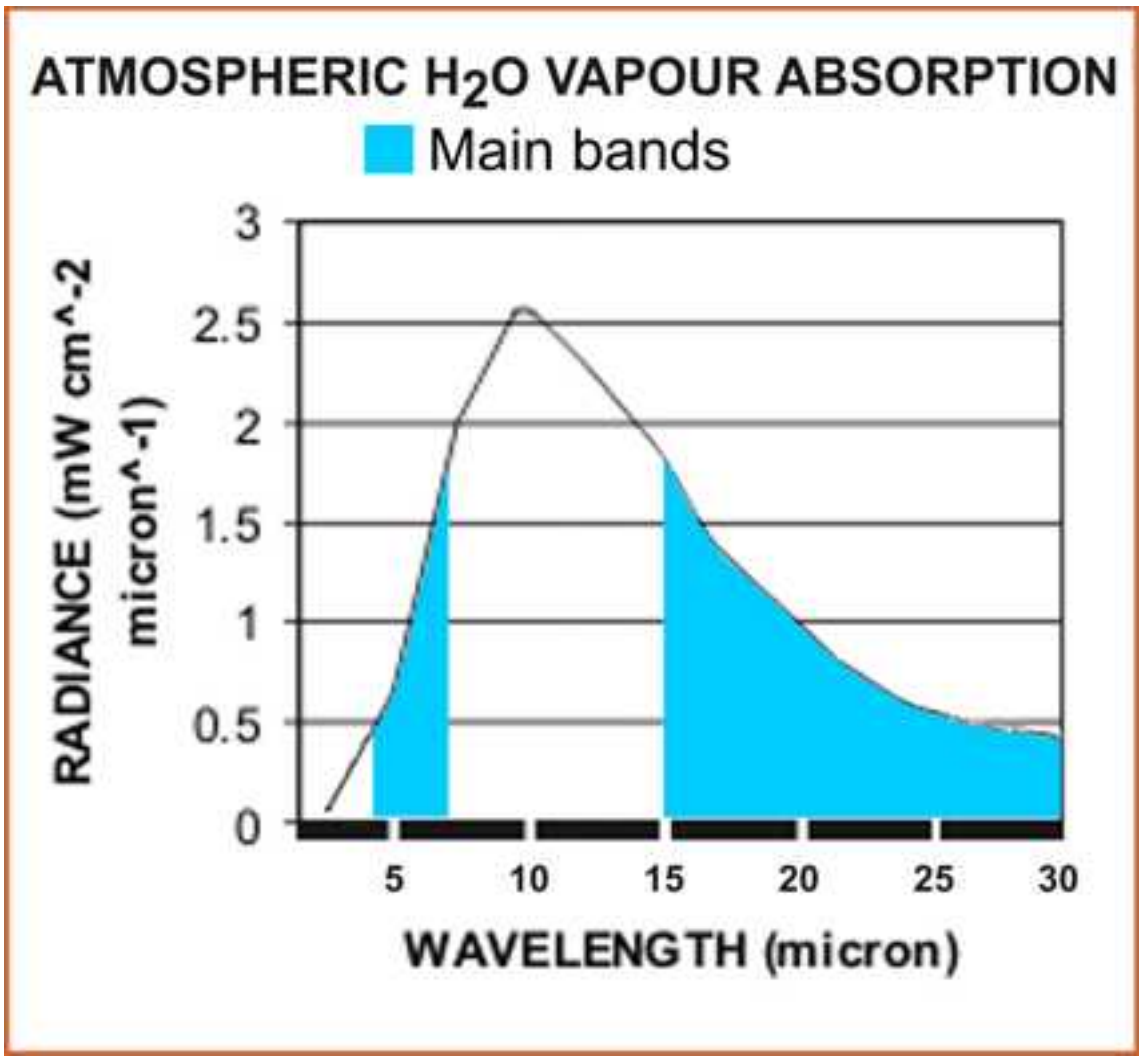
The situation is further clarified in this next figure, where we show the effect of increasing the concentration of CO2 on atmospheric heating.



The first 20 ppm of CO2 essentially makes the atmosphere almost opaque at those previously shown wave lengths, so that doubling the concentration to 40 ppm increases the heating effect by only 20 % more. Doubling it again to 80 ppm increases the heating effect by only 7 %.

As you can see, increasing the concentration further diminishes the heating effect, so that by the time we get to the last century's increase from 280 to 380 ppm, the effect is utterly trivial. It is as though you had blackened a glass window with one coat of paint so that it was 99 % opaque. Adding a second coat increases its opacity by only 1 % more, but it is now completely opaque. Adding a third coat, has no visible effect at all.

Even more significant is the effect of water vapor in the atmosphere, which for a tropical atmosphere can be as high as 20,000 parts per million. Its absorption bands in the infrared are far more significant than those of CO2. They are shown here and they absorb an order of magnitude more than can be absorbed by CO2.



In addition, water in the form of cloud droplets covers on the average about 30 % of the earth's atmosphere, so that clouds will keep about 30 % of this central radiance from being lost to free

After looking at such data and evaluating it, the conclusion of our 1994 paper was (and I quote):

" The problem of obtaining a reliable value for the absorptivity to emissivity ratio for all the entities at the earth's surface and in its atmosphere that participate in the radiative equilibrium process is a formidable task. It is unlikely that any proposed model contains a realist ratio for the entire globe over a long enough time scale….

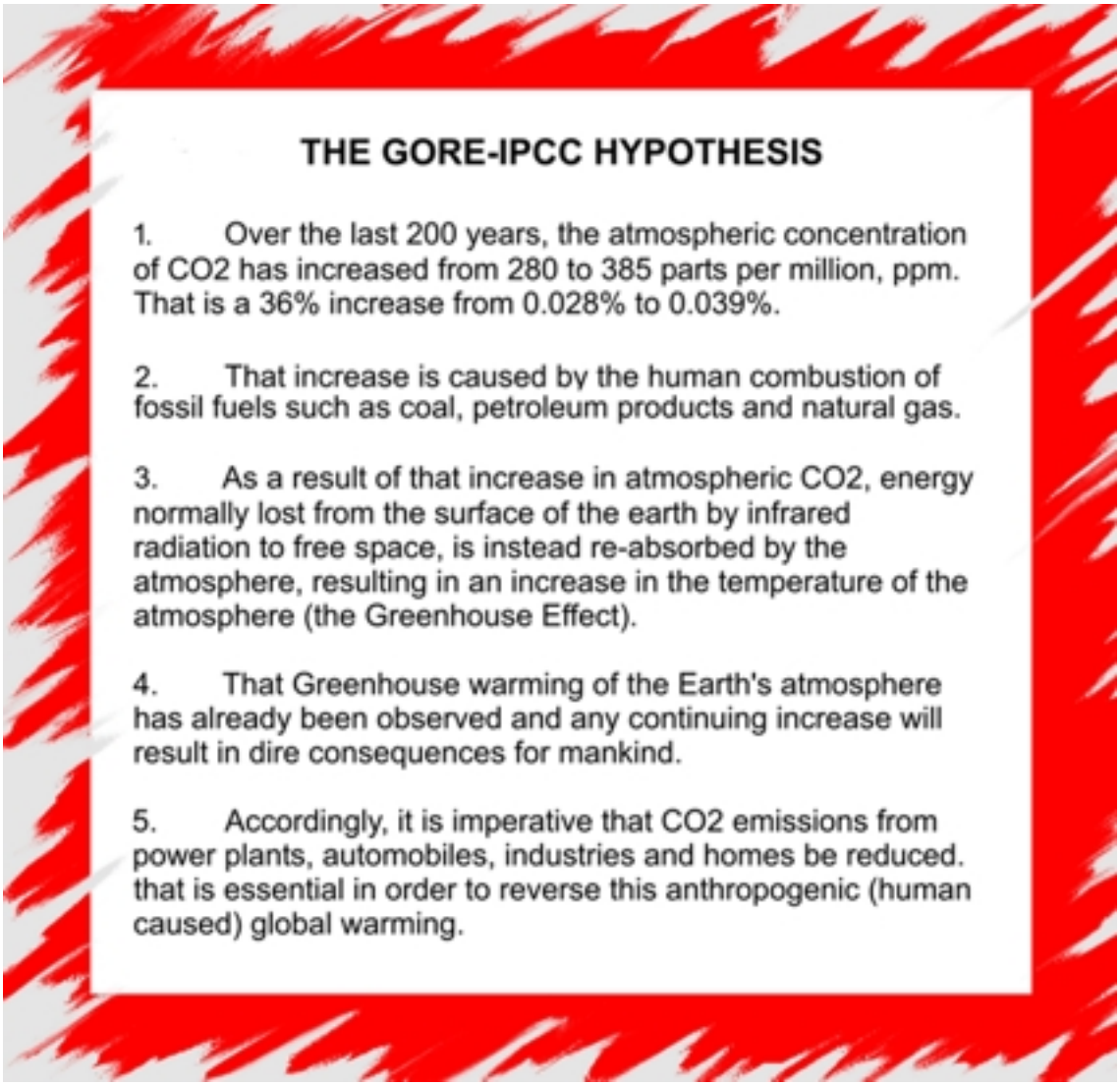
" It is implausible to expect that small changes in the concentration of any minor atmospheric constituent such as carbon dioxide, can significantly influence that radiative balance, despite the fact that carbon dioxide plays a major role in the biosphere. The most significant atmospheric component in the radiative balance is water: as a homogeneous absorbing and emitting vapor, in its heat transport by evaporation and condensation; as clouds, snow and ice cover, which have a major effect on the

albedo, and as the enormous circulating mass of liquid ocean, whose heat capacity and mass/energy transport with the atmosphere dominate the earth's weather." (end quote)

In the 14 years since that conclusion was drawn, all the data I have seen only further reinforces that conclusion. So much so, that I currently dramatize that conclusion on the subject by saying:

" In comparison to water in all of its forms, the effect of the carbon dioxide increase over the last century on the temperature of the earth is about as significant as a few farts in a hurricane!"

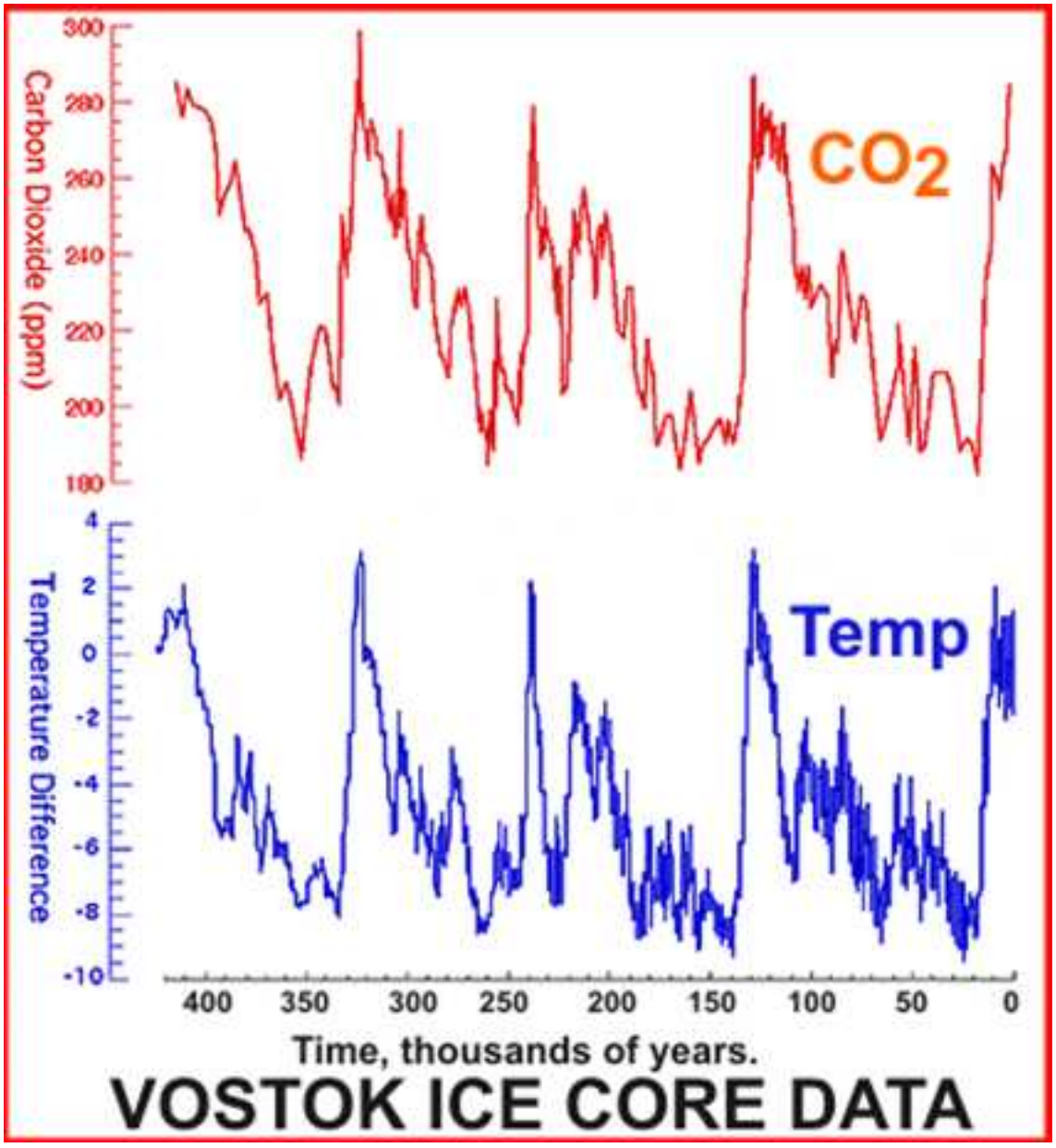
In the intervening years, as the fear mongering hysteria on the subject of human caused global warming grew, and as Gore was able to negotiate the Kyoto protocol on the subject, I felt compelled to get my analysis published more widely. I wrote to Bert Bolin, the Swedish oceanographer, who headed the IPCC, and submitted the paper to Nature and Science, but despite the fact that I had published about 100 research papers by then, including a Navy manual on the use of computer models to forecast weather, they wouldn't publish my analysis. Who was I to challenge all those sophisticated computer models that were predicting catastrophic warming as a result of human emissions of CO2? Never mind that none of them had ever been verified, and besides I was challenging the results of an industry that was being supported by billions of dollars of research contracts and grants. Now since that 1994 paper, I have had the opportunity to study the data dealing with some of the other steps in this indictment of Carbon Dioxide, the Earth's innocent source of life, the essential ingredient of photosynthesis on which virtually all life on earth depends. We have dealt with step 3 of the Gore-IPCC table; now we shall move to consider step 2.


THE GORE-IPCC HYPOTHESIS
1. Over the last 200 years, the atmospheric concentration of CO2 has increased from 280 to 385 parts per million, ppm. That is a 36% increase from 0.028% to 0.039%.
2. That increase is caused by the human combustion of fossil fuels such as coal, petroleum products and natural gas.
3. As a result of that increase in atmospheric CO2, energy normally lost from the surface of the earth by infrared radiation to free space, is instead re-absorbed by the atmosphere, resulting in an increase in the temperature of the atmosphere (the Greenhouse Effect).
4. That Greenhouse warming of the Earth's atmosphere has already been observed and any continuing increase will result in dire consequences for mankind.
5. Accordingly, it is imperative that CO2 emissions from power plants, automobiles, industries and homes be reduced. that is essential in order to reverse this anthropogenic (human caused) global warming.

Step 2 claims that the observed increase was caused by the human combustion of fossil fuel, step 4 argues that that anthropogenic increase represents a serious danger for mankind, and step 5 indicates that it is imperative that human emissions be reduced.

I will present some of the data that contradicts this Gore - IPCC hypothesis.

Also, several years ago, by pure chance, I met Alexander Cockburn, a columnist for the Nation magazine on a Nation cruise, and sensed that he too was a global warming skeptic. I sent him copies of my paper, my several letters to the editor, and other correspondence. Last year he wrote a series of columns based in part on my work. Copies of that series of columns are available for you to take with you. Politically, Cockburn is well to the left of me, and he has received lots of vituperative criticism from environmentalists and others for his articles. I myself have been accused of being a tool of the coal barons, which would come as a great surprise to them, since I spent most of my career advocating for more stringent safety regulations in their mines. So let's look at some more data, as shown here –



Here is the Vostok ice core data for the last 420,000 years. Gore showed this curve in his movie and in his book, “An Inconvenient Truth”. The red line shows the atmospheric CO2, and the blue line is the temperature relative to recent values.

The data show a remarkably good correlation in the long term variations in temperature and CO2. There are four Ice Ages shown with average temperatures some 6 to 8 C below current values. Those ice ages are characterized by CO2 concentrations as low as 170 - 190 ppm.

Five Interglacial Warming periods are shown with temperatures some 2 to 4 C above current values. They are characterized by CO2 concentrations as high as 270 to 300 ppm.

The last warming period shown is the current one that started after the last ice age ended some 20,000 years ago. Gore uses this data to argue that this proves that high CO2 causes global warming, and that the current levels at 385 ppm are higher than any over the past 420,000 years. And that's all you read about in newspaper headlines.

Is that an objective evaluation of this data? Let's look at what Gore failed to mention. First, this correlation has been going on for about half a million years, long before any significant human production of CO2 which began only two hundred years ago.

Two hundred years is a bare pencil width on this time scale. Thus, it can be argued that the current overall increase in both CO2 and temperature are merely the continuation of a natural process that has nothing whatever to do with human activity.

What he also fails to mention is data from the Eocene period some 20 to 30 million years before humans even appeared on the earth. In the Eocene, high latitudes were ice free, some 10 C warmer than they are today, and CO2 concentrations were over 1,500 ppm, some 400 % higher than they are today.

But Gore's most egregious error is his contention that these high CO2 values actually caused the temperature rises.

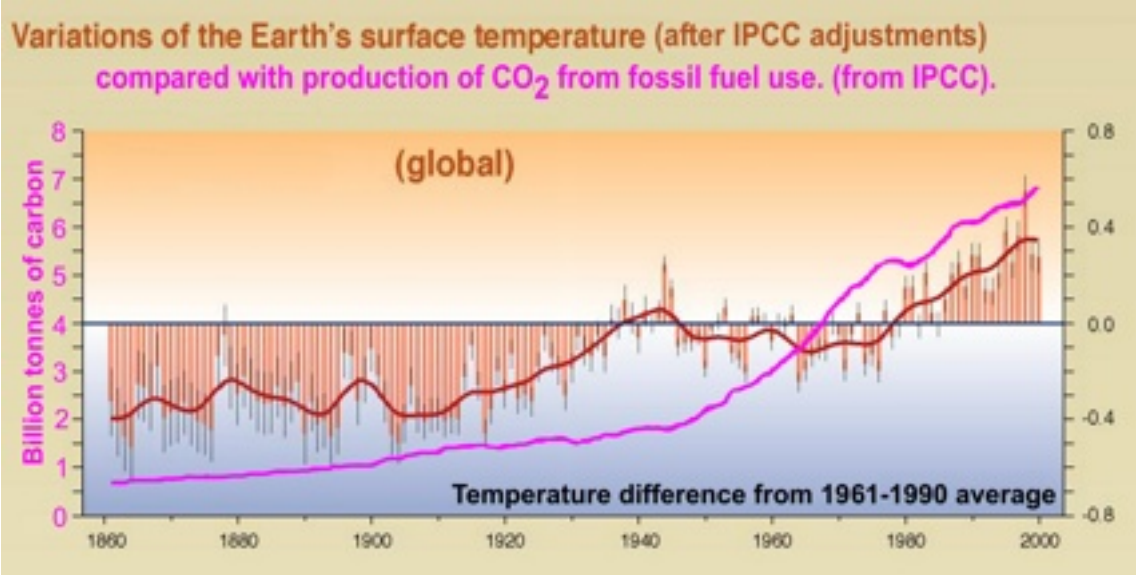
What he knows but fails to mention is that these same data show that the changes in temperature always precede the changes in CO2 by about a thousand years.

The temperature increases or decreases come first, and it is after that that the CO2 follows. Any objective scientist looking at that result would conclude that it is the warming that is causing the CO2 increase, not the other way around as Gore claims.

Gore also neglects to ask the most logical question: where did all that CO2 come from during those warming periods when the human production of CO2 was essentially zero? The answer is that it came from the same place that the current increase is coming from: from the oceans. The amount of CO2 dissolved in the Earth's oceans is at least 50 to 100 times greater than the amount in the atmosphere. As oceans warm for whatever reason, some of their dissolve CO2 is emitted into the atmosphere, just as your soda pop goes flat and loses its dissolved CO2 as it warms to room temperature. As oceans cool, CO2 from the atmosphere dissolves back into the oceans, just as soda pop is manufactured by injecting CO2 into cold water.

That explains not only the CO2 variations in this data for the 420 thousand years before any human production of CO2, but also the much larger CO2 increases that occurred some 20 - 30 million years before humans even appeared on the earth.

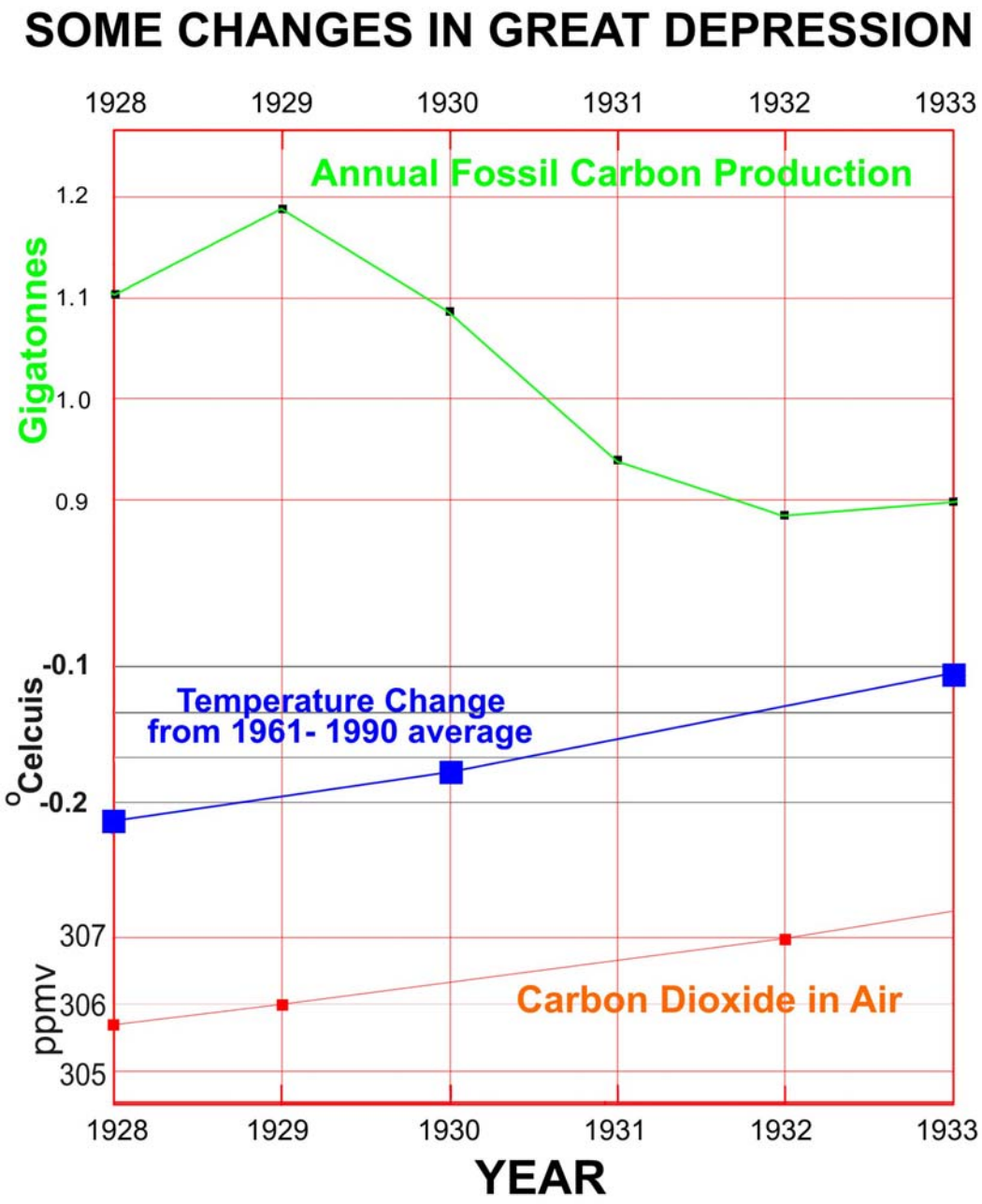
So Gore and the IPCC have it back asswards: it is the warming of the earth that is causing the increase in CO2, not the other way around as they claim. Let us look at some more data on the question of whether the current modest increase in the average temperature of the Earth is caused by the human production of CO2. The data for the recent decades is shown here:



This is the IPCC data for temperature changes shown in red with the scale on the right. The orange line shows the overall temperature trends. It is compared with the human production of CO2 from fossil fuels, shown in purple with the scale on the left. The overall increase in both quantities over the last century or so does not prove a causal relationship.

After all, lots of things have increased over the same period: the average height of buildings, the population of San Diego, the production of corn, the cost of living, and none of those is causally related to atmospheric temperature. The devil is in the details, for if we look at the period from 1940 to 1970, the average temperature of the earth dropped some 0.25 C at a time when the human production of fossil fuels tripled. I remember that period of the 1960's when we were warned that another ice-age was coming. Those warnings came from some of the same people who are now pushing the global warming scare. The rate of increase of temperature from 1910 to 1940 was about the same as from 1970 to 2000, yet the fossil production then was five times smaller than it is today.

One of the more dramatic contradictions to the Gore-IPCC hypothesis is one that I came up with myself, and which appealed to Cockburn and to an Australian group of fellow skeptics. Let's assume for the moment that Gore-IPCC are right; namely that the human production is dangerous and that we must reduce human production of CO2. So let's do it! Guess what? We've been there and done that, and we didn't need the Kyoto protocol to do it. We reduced the world wide production of fossil carbon dioxide by a whopping 30% starting one year before I was born. Here's the data:



This is what actually happened during the years of the Great Depression. In 1929, production was at 1.17 Gigatons of carbon burned per year. Then the stock markets crashed, the depression hit, and human generation fell to 0.88 Gigatons per year.

What did the atmospheric CO2 and temperature data show during those three years? As you can see from the lower curves, they didn't skip a beat in their relentless rise at their normal rate. So a 30 % decline in fossil carbon dioxide emission has absolutely no effect on temperature or atmospheric CO2.

Why? Again because the increase in CO2 is coming from somewhere else: namely, the oceans, and the temperature is unrelated to human activity.

I don't have time now to go into all the details, but our best estimate of the human contribution of CO2 to the atmosphere is that it trivial compared to the total amount generated naturally from respiration, the decay of vegetation, naturally occurring fires, volcanic eruptions, and the weathering of carbonate rock. Incidentally, when I indicated that the amount of CO2 dissolved in the ocean was about 50 to 100 times greater than the amount in the atmosphere, I neglected to mention that the amount of CO2 in carbonate rock in the earth's crust contains about 2000 times more than the amount dissolved in the ocean.

So far in my criticism of the Gore-IPCC hypothesis, we were dealing with lack of objectivity, or failure to ask the important questions. I will end this talk with two examples that go beyond that, and which border on fabrication.

The global warming advocates including the IPCC argue that the CO2 we emit into the atmosphere lasts for centuries. Some even claim that it accumulates for thousands of years. Like unabsolved sins, they claim that our transgressions will pile up until the earth gets so hot that it burns up creating the hell we deserve.

The most authoritative study of the lifetime of CO2 in the atmosphere was done by a Norwegian, Professor Tom Segalstad of the University of Oslo. The measured lifetime, based on the studies of some 50 independent researchers is at most about 5 years.

The best measurements came from the rate of decay of the radioactive isotope of Carbon, Carbon 14 which was injected into the atmosphere during past, above-ground nuclear weapons tests. It is an unambiguous and accurate measurement. You just measure its decay in the atmosphere as a function of time. Segalstad concludes that the short lifetime means that CO2 is quickly taken out of the atmosphere and recycled into the oceans. Despite such authoritative measurement, the global warming advocates still maintain that CO2 accumulates in the atmosphere for hundreds of years.

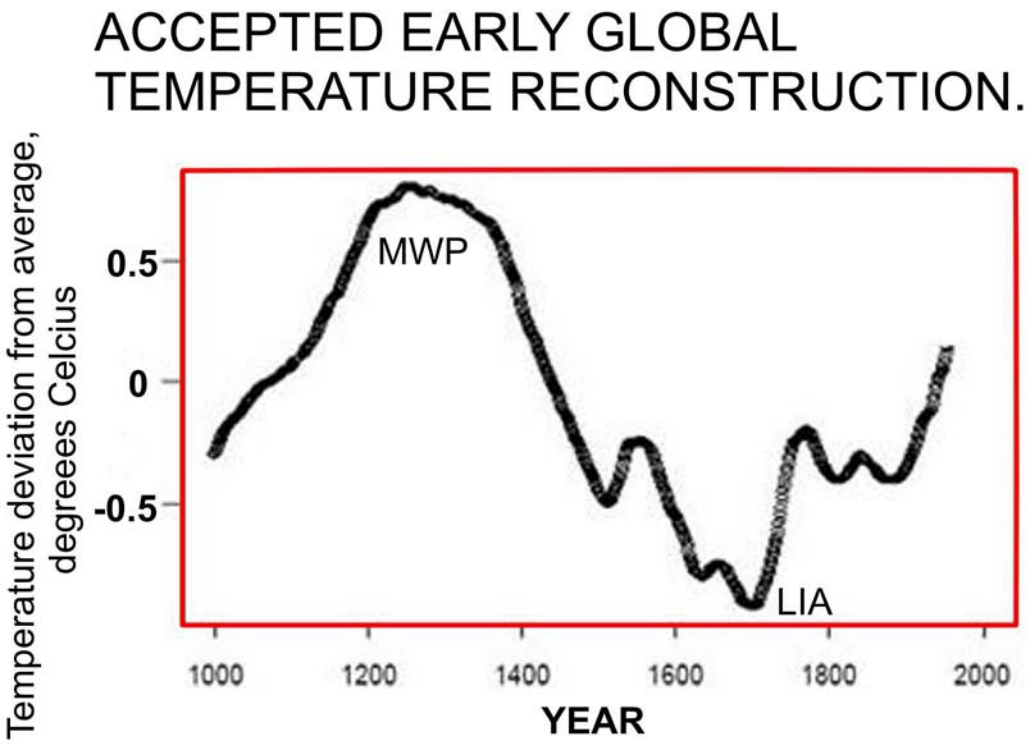
I will quote from Professor Segalstad's recent e-mail to me:

" It is incredible that this wild idea of CO2 being an evil gas in the atmosphere has paralyzed most of the world today, especially since it is the "gas of life" responsible for photosynthesis that makes the food we eat. Daily we see the news media presenting apocalyptic views, not backed by solid measurements or comprehensive scientific theory. When we try to correct them, our contributions are usually rejected…..Editorial committees in scientific journals are now IPCC-supporting people, not allowing critics to appear in print. A manuscript submitted by me to Nature was rejected with only one sentence: '30 years of greenhouse effect research cannot be wrong'. I was tempted to tell the editor that he should terminate his publication altogether. After all if everything they published in the last 30 years was correct, who needs any more research."

Too bad the small committee of the Norwegian parliament that awarded Gore and the IPCC the Nobel Peace Prize didn't have enough sense to consult with Prof Segalstad before they made their ghastly mistake. He was only a short distance away and he knew more about the subject than anyone of them.

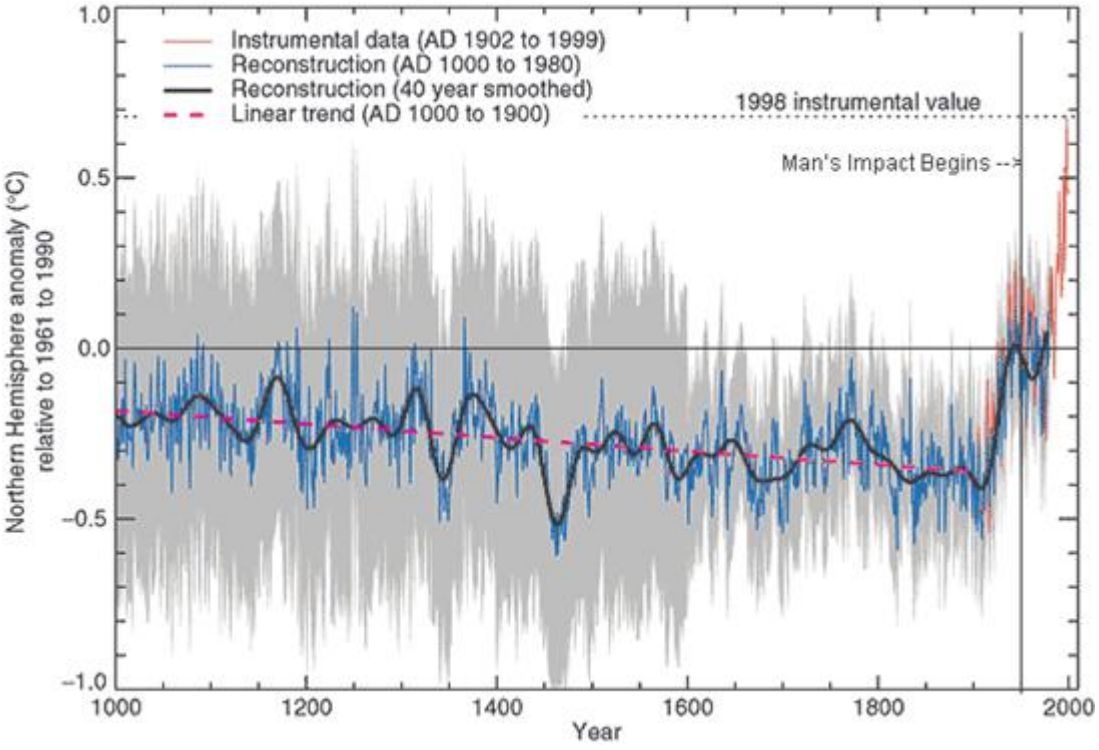
But as you can see, Prof. Segalstad's experience in getting his work published is similar to mine.

My final example is one of egregious fabrication. It is the infamous story of the hockey stick curve, as depicted here:



Source: IPCC 1990. Since adjusted.

Now, the Hockey stick:



In their 1990 report the IPCC published the upper graph, of how global climate had changed over the past 1000 years. It shows the Medieval Warm Period from 1000 to 1400 AD, and the Little Ice Age from about 1400 until 1880 AD. Those periods were well established in European history: for example, the Viking colonization of Greenland during the Medieval Warm Period, and those settlements collapsed during the Little Ice Age, when even the Thames in London froze over. Like the Vostok data, this curve presented a serious problem for the global warmers: the Medieval period was warmer than today with no significant human emission of CO2, so what's so unusual about the current warming trend? The problem was solved for the global warmers by an obscure 1999 paper which used tree ring data to assess past temperatures.

Tree ring data are not a particularly reliable temperature proxies because tree rings are also influenced by other factors such as rainfall, sunlight, cloudiness, pests, competition from other trees, soil nutrients, frost and snow duration. Nevertheless, that tree ring curve is shown in the lower figure. As can be seen, it has the shape of a hockey stick.

Within a matter of months this hockey stick curve was accepted by the IPCC. Never mind that trees only grow on land and that 71 % of the earth is covered by water and thus have no trees. Never mind that the data were only from the Northern Hemisphere, but soon thereafter in a U. S. National Assessment, it became the global temperature curve. The coup was "total, bloodless, and swift and the hockey stick was greeted with a chorus of approval from the greenhouse industry."

Suddenly, the Medieval Warm Period and the little Ice Age became non events, consigned to a kind of Orwellian 'memory hole'. The global warmers argued that if those events had existed at all, they were strictly local, European phenomena.

The tree ring results were trumpeted in the media:

"New studies indicate that temperatures in recent decades are higher than at any time in the past 1000 years……with the 1990's as the warmest decade and 1998 as the warmest year".

Many knowledgeable climatologists and others questioned those results, and asked for copies of the original data to check the analysis. The authors of the hockey stick report resisted, and only grudgingly yielded, so it took years to get the data and the complex computer program used to analyze the tree ring data.

An independent committee of statisticians was finally appointed to evaluate the tree ring results. They concluded that the authors had 'misused certain statistical methods in their studies, which inappropriately produced hockey stick shapes in the temperature history'. They also concluded that the claim that the decade of the 1990's was the hottest decade in the millennium and that 1998 was the hottest year in that millennium, could not be supported by the original data.

So how did the latest IPCC report of last year handle this issue? Did they make the appropriate correction and retract their previous assessment. Absolutely not. They simply never mention it, putting the whole issue into the same "memory hole" that they had earlier placed the Medieval Warm Period and the Little Ice age.

In recent years, climatologists have spread out all over the globe and found clear records of both the Medieval Warm period and the Little Ice Age in the following locations: the Sargasso Sea, West Africa, Kenya, Peru, Japan, Tasmania, South Africa, Idaho, Argentina, and California.

Here is the conclusion of a very distinguished, recently deceased, Australian climatologist, about this hockey-stick fiasco:

"The evidence is overwhelming, from all corners of the world, the Medieval Warm Period and the Little Ice Age clearly show up in a variety of proxy indicators, proxies more representative of temperature than the inadequate tree ring data.

"What is disquieting about the hockey stick is not its original publication. As with any paper, it would sink into oblivion if found to be flawed. Rather it was the reaction of the greenhouse industry to it - the chorus of approval, the complete lack of critical evaluation of the theory, the blind acceptance of evidence that was so flimsy. The industry embraced the theory for one reason and one reason only - it told them exactly what they wanted to hear."

Sound familiar? Remember the Iraqi defector code-named 'curveball' and his stories about all the weapons of mass destruction in Iraq?

What I have presented so far is just a small fraction of all the data available that directly contradicts the Gore - IPCC arguments.

If we pursue the folly of carbon sequestration or carbon credit trading, we will be wasting hundreds of billions of dollars and it will have no effect at all, just as the 30 % reduction in fossil production during the great depression had no effect at all. The earth's oceans and the photosynthesis process are much more effective in the sequestration of CO2 than anything we can do artificially. Wasting hundreds of billions of dollars chasing this phantom of global warming won't be as wasteful as our idiotic war in Iraq, but it is still real money, and it will have no effect at all.

There are real environmental problems caused by human activity: acid rain, acid mine drainage, heavy metal pollution from that drainage, deforestation, carcinogenic particulates in diesel exhaust, mercury pollution from power plants, PCB's, the transportation and storage of nuclear waste, the contamination of drinking water supplies and the necessity of maintaining a reliable public infrastructure for such water supply. And of course there are the critical economic and political problems associated with our excessive dependence on imported petroleum. We should focus on those, and stop chasing the global warming phantom.

One final note: nuclear power plants generate no CO2 in their normal mode of operation, so one would think that global warming believers would be pushing nuclear power as the cleaner alternative to coal-fired power plants. Yet, Gore, in his movie and in his book doesn't even mention nuclear power. Cockburn, in his series of articles discusses that issue in more detail. In the late 1980's, when I first started studying this issue, I spent a summer doing combustion and fire research at the National Center for Scientific Research in Orleans, France. I was surprised to find so many otherwise intelligent scientists uncritically buying into the human caused global warming arguments.

But, of course, that was France, a nation that had already completed committed itself to nuclear power. Even here in the U. S., there are environmentalists who would normally be opposed to more nuclear power plants, but who are so taken in by the global warming hysteria, that they consider nuclear power as the lesser of two evils, and are leaning toward nuclear power as the solution to the global warming crisis. And if you believe that, I have some bridges in Brooklyn that I would like to sell you!

Dr. Martin Hertzberg is a combustion research scientist who worked on the prevention of fires and explosions in mines and other industries at the Bureau of Mines in Pittsburgh, PA. He also contributed to our understanding of the fundamental mechanism of combustion in gases and dusts. He currently teaches science and mathematics at various educational institutions, and occasionally consults as an expert on the causes of accidental fires and explosions. He served as a meteorologist in the US Navy and has been studying the global warming issue for the last twenty years.

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The Climate-Change Hoax II

In my first article. I indicated that detailed scientific references would be provided that contradicted the theory of human caused global warming.

For data on temperature, global ice coverage, and sea level, see

www.climate4you.com, and click on September 2009. The data show nothing dramatic but some cooling in recent years, in direct contradiction to the IPCC model predictions of years ago.

For "the hockey stick fiasco" and an analysis of the Vostok ice-core data going back 500,000 years, see, http://bit.ly/YEgGw and www.rocketscientistsjournal.com ., the article "The Acquittal of CO2".

For a thorough review of the history of the discredited "greenhouse warming theory" and the basic physics that proves it to be devoid of physical reality, see

http://arxiv.org/PS_cache/arxiv/pdf/0707/0707.1161v4.pdf

For the lifetime of CO2 in the atmosphere, its natural sources and sinks in the biosphere and oceans; and the trivial amount of the human contribution, see

http://bit.ly/10PX7d

For my analysis of the earth's temperature fluctuations and our nation's energy problems see www.icecap.us/images/uploads/EE20-1_Hertzberg.pdf

and http://bit.ly/2XSKIe

When done, you will probably ask yourself the same question that many who heard my talks asked: "Why haven't I heard these arguments before?" Simply because journalists and politicians have failed to exercise due diligence in researching the issue in depth.

The other question usually asked is "what is the motive for all this?" To find out "cui bono" simply "follow the money".

First the major actor, Al Gore, has made over $100 million from his movie, book, and lectures. Next his advisors, Schneider and Hansen fear mongered about the coming ice age in the 1970's but are now fear mongering about global warming. In both instances, they argued that human emissions were the culprit. They have a clique of camp followers: in government, universities, among contractors and climate modelers, all with a vested interest in keeping research dollars flowing . The total amount spent so far is about $ 70 billion.

Next there are the nuclear power advocates: nuclear reactors generate no CO2 as they produce electricity, so they can solve our nonexistent C02 problem. Their motives were openly revealed during the last election when John McCain flipped from opposing "cap and trade' to supporting it. He campaigned for building many more nuclear reactors to solve the "climate-change crisis". From his earliest days in Congress, Gore himself faithfully represented the interests of the nuclear establishments such as the Oak Ridge National Lab in Tennessee.

Next there is the renewable energy industry. They also generate no CO2 as they produce electricity. Their advertising campaigns claim that solar and wind power can eliminate our dependence on imported petroleum when, in fact, they do not produce a single drop of the gasoline we need for the transportation sector of our economy. Colorado's Governor and our members of Congress push their agenda incessantly. Solar and wind power require enormous subsidies and do not presently meet the nation's requirements for continuous and reliable electric power.

Next there are the bunch of environmental lobbyists and activists and their camp followers in the mass media (even PBS and the BBC) who simply regurgitate the anecdotal clap trap they are fed about polar bears, northwest passages, melting ice-caps, drastic rises in sea level, increases in hurricane frequency and intensity, and all the other weather disasters that you need to feel guilty about! Just remember that they are the same bunch that succeeded in getting a world-wide ban on the use of DDT. The result was a skyrocketing death rate from malaria (estimated to total about 30 million of the world's children) until the WHO finally rescinded the ban. Immediately upon DDT's re-use, the death rate declined markedly to its pre-ban level. So, yesterday, the know-nothing environmentalist's fear-mongering about DDT gave us malaria. What gift will their fear-mongering about climate-change bring to us tomorrow?

Next, it is not simply a matter of money, but one of power. All of the above interest groups and the politicians they support have huge egos and a lust for power. That is far more important to them than the triviality of scientific truth. Once committed to one side of a political issue, they will rarely admit they may have made a mistake. Once having invested their political capital and our economic resources to start the huge, massive inertia wheel turning, it takes too much courage, energy, and loss of face to stop it. That was the case with the war in Vietnam, and currently with the wars in Iraq and Afghanistan.

Never underestimate the power of fear-mongering hysteria. Fundamentalists find it very effective for proselytizing their religion. Neo-cons and Republicans conned us into the war in Iraq by fear-mongering about Iraq's weapons of mass destruction. They are doing the same now to defeat health care legislation with their "death panels". So, for the climate-change issue, it looks like my fellow, liberal Democrats are finally learning the lesson: fear mongering can keep the inertia wheel of the global warming hoax rotating to the lucrative benefit of all their supporters. But what about the damage to the nation when it flies off its hinges in the form of draconian legislation for carbon emission control? Such legislation will have absolutely no effect on weather but will do serious harm to our economy and to working Americans.

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Copper Mountain, CO

by

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ABSTRACT

The average equilibrium temperature for all the Earth's entities involved in its radiative balance with the Sun and Space, is given by:

T (e) [K] = 278.9 [(1 - á) / å] 1/4

The controlling factor is the ratio of the absorptivity, a = (1 - á), to the emissivity, å . The quantity á is the Earth's albedo. It is shown that relatively modest changes of only a few percent in á, brought about by variations in cloudiness, are sufficient to account for the observed 20th Century variations in Earth's measured temperature, provided that such variations in cloudiness can cause an imbalance in the ratio (1 - á) / å . The analysis suggests that in the long run, the absorptivity to emissivity ratio is near unity, as required by Kirchhoff's radiation law, which ensures a moderate average temperature of about 5.7 C for the Earth's surface entities. That calculated temperature is in fair agreement with the observed average temperature of those entities, whose mass average is dominated by the mass of the oceans. Except for the influence of clouds on the albedo, no assumptions are needed regarding the detailed composition of the atmosphere in order to explain the observed small fluctuations in the 20th Century temperatures or the larger, longer-term variations of Glacial Coolings and Interglacial Warmings.

1. INTRODUCTION

In 1994, this author, in cooperation with Prof. J. B. Stott of the University of Canterbury in New Zealand, presented a poster-session paper at the 25th International Symposium on Combustion [1]. That paper was entitled "Greenhouse Warming of the Atmosphere: Constraints on Its Magnitude". Calculations in that paper showed that CO_2 absorption was relatively insignificant in comparison to absorption by the

homogeneous water vapor content of the earth's atmosphere. Several conclusions were drawn in that paper. One was that:

.....water vapor plays such a dominant role that any greenhouse 'runaway'predicted for the Earth's temperature should already have occurred. But since the ocean's water vapor flux increases exponentially with temperature, the increase in cloud cover albedo, inevitably limits or 'buffers'the system.

The final conclusion of that analysis was as follows:

It is implausible to expect that small changes in the concentration of any minor atmospheric constituent such as carbon dioxide, can significantly influence that radiative equilibrium (i. e. between the Earth and the Sun) despite the fact that CO2 plays a major role in the biosphere. The most significant component in the radiative equilibrium process is water: as a homogeneous absorbing and emitting vapor; in its heat transport by evaporation and condensation; as clouds, snow, and ice cover, which have a major effect on the albedo; and as the enormous circulating mass of liquid ocean, whose heat capacity, and mass/energy transport with the atmosphere, dominate the Earth's weather.

In the detailed analysis, it was noted that

The problem of obtaining a good value for the absorptivity to emissivity ratio for all the entities at the Earth's surface and atmosphere that participate in the radiative balance, is a formidable task. It is highly unlikely that any proposed model contains a realistic ratio for the entire globe over a long enough time scale. One is not dealing with a 'surface', but with a group of distributed entities: the albedo is caused by reflection and scattering from the tops of clouds, from ocean surfaces, from land surfaces covered with vegetation, soil, snow, or ice, and from dust particles distributed in depth. They are heterogeneous entities. But the albedo also has a component from the homogeneous scatterers in the atmosphere. The absorbed fraction of the solar irradiance is absorbed at the above surfaces, and also in depth by the homogeneous components of the atmosphere.

These entities, homogeneous and heterogeneous, are also emitters of the flux of radiation that is lost to free space. They are distributed vertically from sea level to the upper reaches of the atmosphere, and horizontally at all latitudes and longitudes.

And finally, that paper contained the following caveat:

Many interacting regions, both homogeneous and heterogeneous, are involved in the complex radiative balance. Unverified models do not realistically represent that balance, <u>and it would be absurd to base public policy decisions on them</u>

It is quite clear that since that 1994 paper was presented, the above advice has not been heeded. Accordingly, this author feels obligated to expand and refine that previous analysis in this paper, in the hope that the advice he gave in 1994 will now be considered.

2. THE RADIATIVE BALANCE

The gained solar power absorbed by the Earth is determined by its cross-sectional area, and is given by:

$$(1 - á)\, I\, (ð\, r\, 2)$$

where I is the solar 'constant' irradiance, á is the albedo (the fraction reflected and scattered back to space), and r is the radius of the earth. The quantity (1 - á) = a , is the Earth's absorptivity.

The entities near Earth's surface that are involved in the radiative equilibrium with the Sun and Space are the physical surface, atmosphere, and oceans. They are not at a uniform temperature, but they are nevertheless characterizable by some average equilibrium temperature, T(e). Those entities radiate to Space from the entire surface area of Earth, and their emitted, lost power is given by:

$$\varepsilon \sigma T(e)^4 (4 \eth r 2)$$

where å is the average emissivity of those entities, and ó is the Stefan-Boltzmann constant, and T(e) is the temperature in Kelvin.

Equating the absorbed or gained solar power to balance the emitted or lost power at equilibrium, gives an average Earth temperature of :

$$T(e) = [(1 - á) I / 4 å ó] 1/4 \qquad (1)$$

Now the solar irradiance I is fairly constant, and ó is a fundamental constant so that the controlling factor in determining Earth's average temperature is the ratio of the absorptivity to emissivity , (1 - á) / å . Substituting 1373 Watts / m^2 for I [2], and 5.671 x 10^{-8} Watts / m^2 deg^4 for the Stefan-Boltzmann constant [3], gives:

$$T(e) = 278.9 [(1 - á) / å] 1/4 \qquad (2)$$

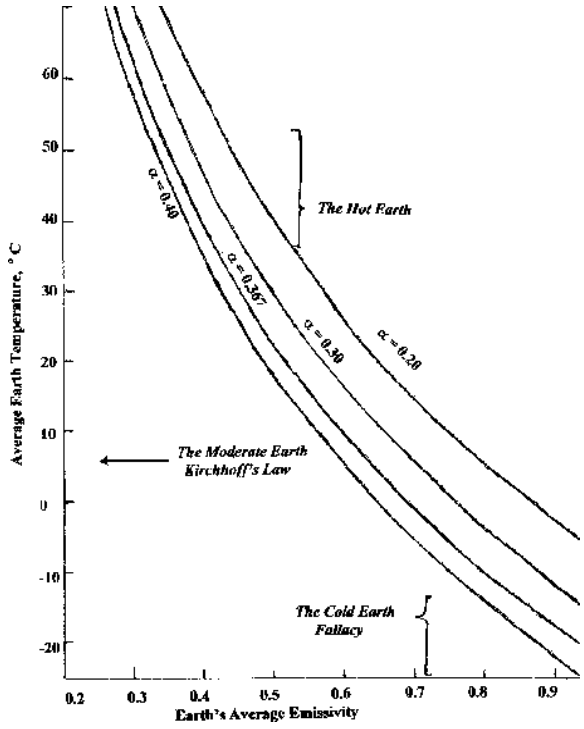

Figure 1. The calculated average Earth temperature, T (e) in degrees Celcius, as a function of average Earth emissivity, for various values of Earth's albedo, .

Figure 1 is a plot of T(e) in degrees Celsius as a function of the emissivity for four values of the albedo. One tabulated value for Earth's average albedo is 0.367 [4], and the graph also plots albedo values of 0.20, 0.30, and 0.40.

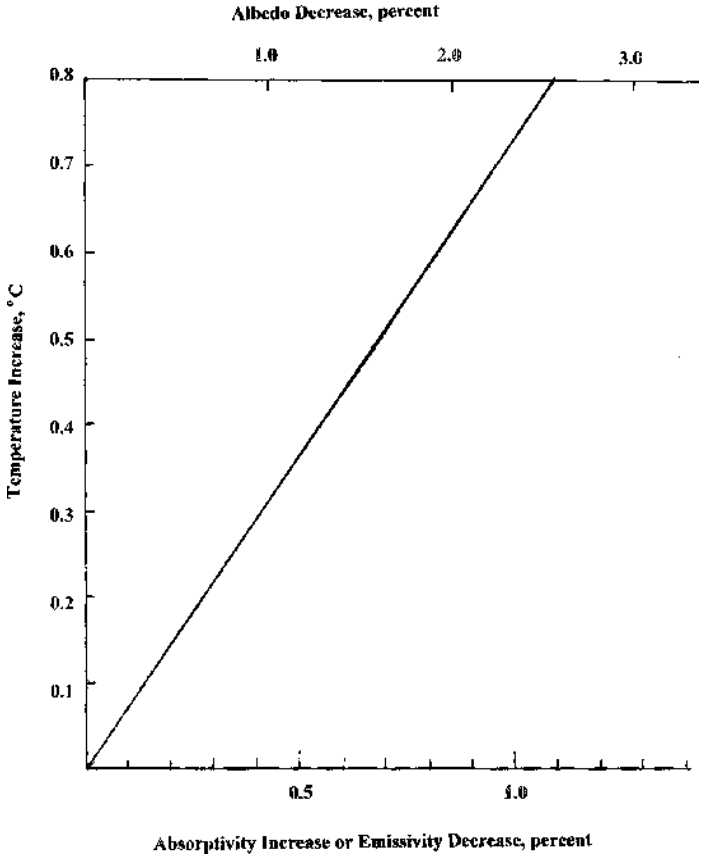

Figure 2. The calculated average Earth temperature increase in degrees Celcius, as a function of the decrease in Earth's albedo in per cent, from an initial value of á = 0.30. The corresponding increase in the absorptivity for those albedo changes is shown, as well as the independent decreases in emissivity that would give the same resultant temperature increases.

Taking the logarithm of Eq. (2), and taking differentials of the result, allows one to calculate the change in average Earth temperature associated with various changes in emissivity, absorptivity, or albedo. That sensitivity curve is plotted in Figure 2 for the current average atmospheric temperature of 291 K, and for an average albedo of 0.30.

Various agencies, including IPCC [5] have estimated the measured changes in the average atmospheric temperature near the Earth's surface over the last century to be as follows:

1910 - 1940, increase of 0.5 C;

1940 - 1970, decrease of 0.2 C;

1970 - 2000, increase of 0.5 C.

As can be seen from Fig. 2, those increases of 0.5 C for the two thirty year spans from 1910 to 1940 and from 1970 to 2000, correspond to a relatively small decrease of only 1.5 percent in Earth's albedo. The observed decrease in temperature of 0.2 C from 1940 to 1970 corresponds to an albedo increase of only 0.5 percent.

Those modest changes in temperature are thus readily explained in terms of minor changes in albedo, brought about by small changes in cloudiness and/or snow and ice cover over the Earth's surface.

There are many possible physical mechanisms at the surface of the Earth, and in its atmosphere, which could generate such modest changes in albedo - and thus account for the observed temperature changes during the 20th Century. For example, the gained solar power absorbed by the Earth is limited to the daylight hours, whereas the power lost from Earth by its radiation emitted to Space occurs continuously from the entire surface, both night and day. Thus, for example, if Earth's cloud cover varied diurnally in a systematic way so that the night hours became cloudier than the daylight hours throughout the year and the seasons, then there would be a net upward trend in the Earth's temperature. Alternatively, if the night hours were less cloudy than the daylight hours throughout the year and the seasons, then there would be a downward trend in temperature.

Such an effect is directly observable in the frost or dew which appear during calm, *cloudless* nights as the Earth's surface cools by radiative losses to Space. For similar calm nights, but with *cloudy* skies, frost or dew do not appear because that radiation is not lost, but is reflected back, keeping the surface warm enough to prevent condensation.

Another example of a heating mechanism, would be a reduction in the fraction of the Earth's surface covered with ice and snow. Replacing those highly reflective surfaces by darkened soil would decrease Earth's albedo, and increase its absorptivity. If there is no compensating increase in the emissivity of that darkened soil, there would be a resultant increase in Earth's temperature.

Another mechanism that could lead to an imbalance in the absorptivity to emissivity ratio, involves the fact that the incoming solar radiation that Earth receives during the daylight hours peaks in the visible region of the spectrum - whereas the outgoing radiation is mainly in the infrared region of the spectrum, in the range of 8 to 24 micrometers in wave length. Cloud droplets are generally much larger in size than the wavelength of the solar radiation, so even thin clouds will scatter and reflect solar radiation and increase the albedo. On the other hand, if cloud droplets are comparable in size to the outgoing infrared radiation and those clouds are thin, they could be relatively transmissive of that outgoing radiation. As a result, the Earth's emissivity for outgoing radiation could be higher than its absorptivity for incoming radiation.

There are many other possible mechanisms that could lead to similar changes in the absorptivity to emissivity ratio which could generate the modest net temperature changes observed during the 20th Century, and in other periods of the Earth's history. Svensmark [6, 7] has shown that Earth's cloud cover underwent a modulation in phase with the cosmic ray flux during the last solar cycle. His suggested mechanism for that correlation involves a decrease in cosmic ray flux during high solar

activity, when the "solar wind" and magnetic activity shield Earth from cosmic rays. The reduced incidence of cosmic rays results in the absence of adequate nucleating agents for cloud formation, a decrease in the Earth's albedo, a corresponding increase in absorptivity, and hence a heating of the Earth. The opposite occurs during low solar activity, when the cosmic ray flux into the Earth's atmosphere is high, nucleating agents are plentiful, and cloudiness increases albedo. This results in a decrease in absorptivity, and hence a cooling of the Earth. The analysis summarized in Figs. 1 and 2 supports the Svensmark mechanism as the cause of the 20th Century fluctuations in the average Earth temperature. As Fig. 2 shows, relatively modest changes of only a few percent in the Earth's albedo are sufficient to account for the observed temperature changes of that Century. *Those are precisely the magnitudes of the changes in cloudiness that are observed by Svensmark to vary in phase with the variations in solar activity.*

However, one must be cautious in this argument - as will be shown in the next section. While an absence of clouds during periods of low cosmic ray intensity will result in an increase in the absorptivity of solar radiation by Earth, the same absence of clouds would mean a corresponding increase in the emissivity of infrared radiation to Space. The net effect could be no change in the average temperature of the Earth *unless those changes in cloudiness also resulted in an overall imbalance in the absorptivity to emissivity ratio.*

3. COLD EARTH FALLACY, WARM EARTH, AND MODERATE EARTH

As shown in Fig 1, and as indicated from Eqs. (1) and (2), the controlling factor in determining the average temperature of the Earth is its absorptivity to emissivity ratio. Now, there appears to be a consensus among both believers in the anthropogenic global warming hypothesis and skeptics of the hypothesis that, in the absence of an atmosphere, Earth would be a frozen "ice-ball" with a sub-zero average temperature of -20 to -25 ^{o}C . That argument is now faithfully reproduced in science textbooks, as an introduction to the subject of global warming from infrared absorption by greenhouse gases in the atmosphere. The theme of the argument is that it is the Earth's atmosphere that "keeps the heat in" via the 'greenhouse effect', and it is that effect which makes Earth warm enough for human habitation. The natural corollary of the theme is that too much 'greenhouse effect' from too much carbon dioxide and other infrared absorbing gases, would make Earth too hot for human habitation.

Let us examine that argument in more detail using Fig. 1, which was obtained from Eqs. (1) and (2). As can be seen from the graph, for an average albedo of 0.367 (which equates with an absorptivity of 0.633) the only way one can obtain sub-zero temperatures as low as -20 to -25^{o}C, is to have an almost perfectly emissive Earth (emissivity near unity). *Such a unit emissivity assumption, however, directly contradicts the use of an albedo of 0.367*. Since most of the albedo is caused by cloud cover, it is impossible for Earth to radiate out into Space with unit emissivity if 37% of that radiation is reflected back to Earth, or absorbed by the bottom of those same clouds. Even for those portions of Earth that are not covered with clouds, the assumption that the ocean surface, land surfaces, or ice and snow cover would all have blackbody emissivities of unity, is unreasonable.

This unrealistic set of assumptions - leading to sub-zero average temperatures for Earth - is shown in Fig.1; and it is referred to there as the "Cold Earth Fallacy".

It is certainly true that in the absence of an atmosphere, temperatures would drop drastically at night as the darkened portions of Earth lost infrared energy by radiation to Space; however, with all the incoming solar radiation being concentrated on the daytime half of the surface, daytime temperatures would rise as drastically as the night time temperatures would fall. That is what is observed on the surface of the moon in the absence of an atmosphere, and to a much lesser extent in the desert regions of Earth. The conductivity of the ground surface is too low to moderate those extremes. By contrast, the fluid motions within the atmosphere and oceans, together with the energy exchanges between the oceans and the atmosphere, do provide the convective flows and energy exchanges that moderate those surface temperature extremes. In addition, the enormous heat capacity of the oceans and the high heat capacity of the atmosphere, in comparison to the much lower heat capacity of the thermally-thin ground surface layer, also moderate those extremes. Despite any such extremes, the average temperature, according to the above analysis, should not depend on the presence or absence of an atmosphere per se.

At the other extreme is the "Hot Earth". For the Cold Earth, one had to assume that the ratio of absorptivity to emissivity was 0.633 / 1.00 = 0.633. For the Hot Earth, that ratio has to be inverted so that the absorptivity exceeds the emissivity. For the average albedo of 0.367 (corresponding to an absorptivity of 0.633) and a low emissivity of about 0.35 (which is about half the absorptivity), one obtains an average temperature of 50 C. That region is labeled in Fig. 1 as "The Hot Earth".

Clearly, this analysis shows that the Cold Earth Fallacy and the Hot Earth are unrealistic extremes, corresponding to emissivities that are too high and too low respectively, relative to Earth's absorptivity. As will be discussed shortly, between those two extremes lies a Moderate Earth in which absorptivity and emissivity are more closely matched.

4. COMPLEXITIES IN DETERMINING THE ABSORPTIVITY TO EMISSIVITY RATIO OF THE EARTH.

The problem of obtaining a realistic value for the absorptivity to emissivity ratio for all the entities at Earth's surface, and in its atmosphere, that participate in the radiative balance is a formidable task. The first and most difficult part of the problem is simply to locate the "surface" involved in the radiative-equilibrium process. Upon closer examination, one finds that the "surface" on which the incident solar irradiance is absorbed, and from which Earth radiates outward into Space , is not a simple surface at all. Most of Earth's albedo is caused by reflection of the incident solar flux from several surfaces: from the tops of clouds, from the surface of the oceans, from the surfaces of continents, and from the surfaces of dust particles in the atmosphere. There is also a scattering component to the albedo: from homogeneous gases and heterogeneous particulates in the atmosphere. Furthermore, the absorbed fraction of the solar flux is not only absorbed heterogeneously at those same surfaces, but also homogeneously by the gaseous components: water vapor mainly, with smaller contributions from other gases. That same distribution of homogeneous and heterogeneous absorbers emits the flux that is radiated from Earth to Space.

Those entities are distributed vertically throughout Earth's atmosphere: from the ocean surfaces at sea level, to the mountains at high altitudes, to continental depressions below sea level, and to the upper reaches of the atmosphere at the tops of clouds. Those same entities are distributed longitudinally and latitudinally from the equator to the poles. With what measured temperature are

the calculated ones to be compared? Is it reasonable to expect that the calculated temperatures should be compared only with the air temperatures measured near Earth's topographic surface? How representative is such an average surface air temperature to the entire mass of the atmosphere involved in the radiative equilibrium processes? If the near-surface air temperature is not representative, is it realistically possible to measure the average temperature of the entire mass of absorbing and emitting entities with sufficient accuracy to make a meaningful comparison between the data and the predictions? One is asking for a definition of the mass of matter that constitutes Earth's surface, atmosphere, and oceans. How high in altitude should one go in the atmosphere to include it all? Similarly, how deep in the liquid fluid of the oceans should one go in order to include the mass below the ocean surface that influences the heat and mass transport processes near the ocean surface and in the atmosphere above it? How representative are near-surface temperatures of the average temperature of those vertically distributed, yet poorly defined entities. As difficult as those questions may be, they are nevertheless the ones which need to be answered in order to evaluate the validity of any models purporting to predict future conditions. It was indicated earlier that this was a *formidable* task; however, looking at the problem in depth, it may be more realistic to conclude that its resolution may be *unattainable* given our limited understanding of the complex processes involved, and the lack of data available for the current thermodynamic state of those entities.

5. KIRCHHOFF'S RADIATION LAW

Let us return to Eqs. (1) and (2) where we showed the possible extremes of a Cold Earth in which the emissivity markedly exceeded the absorptivity, and the Hot Earth in which the reverse was the case. Between those two extremes is the real or Moderate Earth, in which the emissivity and absorptivity are matched. In this case, the ensemble of entities would obey Kirchhoff's radiation law which gives:

$$(1 - á) / å = 1, \text{ and } T(e) = 278.9 \text{ K} = 5.7 \text{ C}.$$

Such a matched, moderate condition is normal for a system in thermal equilibrium with its radiation field: it is Kirchhoff's radiation law, which has been abundantly verified in controlled laboratory systems. But in dealing with Earth and its atmosphere, as discussed earlier, one has a complex, non-isothermal system that contains many components, and all three states of aggregation for its most dominant component - water. It is very likely that the earth-atmosphere system will depart somewhat from Kirchhoff's radiation law at specific times and in specific locations; however, the important question to be resolved is the extent to which it can depart from the law in the long run and averaged over its entire spatial extent. The issue of greenhouse warming can thus be posed in terms of the extent to which small changes in the composition of the minor gaseous components of the atmosphere can induce significant departures from Kirchhoff's radiation law in the earth-atmosphere system in such a way that its emissivity becomes significantly lower that its absorptivity over decades or centuries.

Let us look at the Vostok ice-core data [8], and assume that the measured temperature fluctuations recorded in that data are representative of those that were present in the entire earth-atmosphere system for the last 420,000 years. One sees four Glacial Coolings recorded with temperatures of

about 7 C below current values, and five Interglacial Warmings with temperatures some 3 C above current levels. That corresponds to a 10 C temperature variation between Glacial Coolings and Interglacial Warmings. Referring to Fig 1, and neglecting for the moment the Milankovitch [9] variations in solar insolation that drive the Glacial/Interglacial alternation, it can be seen that for an albedo of 0.3 (a = 0.7) a 10 C temperature variation would be attained for an emissivity variation of at most Äå / å = 0.1, or only 10 %. Or alternatively, an albedo increase from á = 0.25 to á = 0.35, at a constant emissivity, could precipitate Glacial Cooling.

The above calculation overestimates the albedo changes required to sustain a Glacial or an Interglacial. The initiating mechanism for either involves the Milankovitch mechanism of increased or decreased solar insolation in the Northern Hemisphere brought about by the changes in Earth's orbital parameters. Those involve temporal and spatial changes in the factor, I, in Eq. (1). The Milankovitch insolation variations are the main driving mechanism, and thus more modest albedo changes than those calculated above would serve to amplify the temperature variations.

It is interesting to speculate whether such a change in albedo can realistically be attained by changes in the areas of ice and cloud cover that might be expected during Glacials and Interglacials. As Glacial Coolings are initiated by the Milankovitch mechanism of reduced solar insolation in the Northern Hemisphere, and ice advances on the Northern Hemisphere land masses, there is an increase in albedo which accelerates the advance of ice, and hence the cooling associated with increasing albedo. Eventually, as the oceans cool during that Glacial, there is a reduction in ocean temperature in the tropical latitudes and the Southern Hemisphere. The decreasing ocean temperature results in decreasing cloudiness, and a reduction in the albedo in those regions; and leads to warming. That warming counteracts the acceleration of the advancing ice and limits its extent.

As the process begins to reverse via the Milankovitch mechanism of increasing solar insolation in the Northern Hemisphere, the extent of ice-cover diminishes, and there is a decrease in the Earth's albedo. That decrease accelerates the rate at which the ice retreats, uncovering more land whose albedo is lower than that of ice - resulting in an increase in Northern Hemisphere warming. Eventually, as the oceans continue to warm, there is an increase in sea-surface temperature in the tropical latitudes and the Southern Hemisphere, resulting in an increase in cloudiness. That increasing cloudiness increases Earth's albedo, resulting in a cooling which diminishes the rate of retreat of continental ice.

Such a negative feedback loop between northern latitudes of the Northern Hemisphere and the rest of the Earth could thus play a role in moderating the magnitude of the temperature fluctuations between the Glacial Coolings and the Interglacial Warmings after they are initiated by the Milankovitch mechanism.

One final speculation: the ocean like the atmosphere, has a significant vertical dimension. Density gradients play an important role in the transport of sensible heat in that vertical dimension and also horizontally between northern and southern latitudes. Pure water reaches its maximum density at 4 ^{0}C, whereas saline ocean water reaches its maximum density at its freezing point which is slightly below 0 ^{0}C. Those density differences, caused by temperature and salinity variations between the polar latitudes and lower latitudes, generate ocean circulations. It is at the temperature of its maximum density that the largest mass of oceanic water accumulates by gravity into an insulated

storage realm of enormous mass in the lowest regions of the ocean depths below the thermocline. Near its maximum density state, that large mass is effectively insulated from the temperature variations of the warmer surface waters in the equatorial and subtropical latitudes. Those higher temperature waters remain floating on the surface while the lower temperature mass sinks by gravity to accumulate below in a storage realm with an enormous capacity for the accumulation of sensible heat. The heat and mass transport from that enormous ocean reservoir to the atmosphere are the dominant factors in determining temperatures and weather conditions over the entire globe.

It is intriguing to note that for the Moderate Earth - which obeys Kirchhoff's radiation law with an absorptivity that was equal to its emissivity - the equilibrium temperature was T (e) = 5.7 ^{0}C. Now, the average temperature of the ocean's surface waters is about 17.6 ^{0}C [10]; however, as one descends below the surface to the thermocline and below, one soon reaches the higher density water in that enormous storage realm whose temperature is nearly constant at about 3 ^{0}C. If one takes a mass weighted average of the surface water temperature of 17.6 ^{0}C and that much larger subsurface mass at 3 ^{0}C, one obtains an average ocean temperature that is close to the 5.7 ^{0}C temperature required by Kirchhoff's radiation law. Is that really a coincidence? Or is it simply a reflection of the fact that Earth is in radiative equilibrium with the Sun, with its absorptivity and emissivity in balance on the longest of time scales. It should be no surprise that balance is maintained by the one entity that meteorologists and climatologists have long known to be the major determinant of Earth's weather - the oceans.

6. CONCLUSIONS

This analysis of the radiative equilibrium balance between Sun and Earth shows that the average temperature of the "surface" of the Earth, which perforce includes all the entities in its physical surface plus its oceans and atmosphere, is controlled by the ratio of its absorptivity to emissivity. It is shown that modest changes of at most one to two percent in the Earth's albedo brought about by modest changes in cloud cover, are sufficient to account for the observed average temperature changes of the last century - provided that those changes in absorptivity are not counterbalanced by comparable changes in emissivity. Several mechanisms are suggested to account for the imbalance in the absorptivity to emissivity ratio. However, those suggested mechanisms by no means exhaust the possibilities.

Nevertheless, the analysis suggests that, in the long run, the emissivity to absorptivity ratio is generally near unity, as required by Kirchhoff's radiation law. That requirement insures a moderate average Earth temperature of about 5.7 ^{0}C for the entities involved in that radiative equilibrium - in fair agreement with the observed mass-average temperature of those entities. That mass-average is dominated by the ocean's mass.

Except for the influence of cloud albedo, this analysis makes no assumptions regarding the detailed composition of the atmosphere. Nor are any such assumptions needed in explaining the observed variations in 20th Century temperatures, or the larger, longer-term variations of Glacial Coolings and Interglacial Warmings. This refined analysis supports this author's earlier conclusion [1] that:

It is implausible to expect that small changes in the concentration of any minor atmospheric constituent such as carbon dioxide, can significantly influence that radiative equilibrium.

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A Greenhouse Effect on the Moon?

May 2010

Introduction

We've been told that the earth's surface is quite a bit warmer than calculations predict. Theory has it that heat-trapping "greenhouse gases" account for a 33° Celsius disparity. But it turns out that our airless moon is *also* quite a bit warmer than predicted. Might something be wrong with the prediction method itself, then? It's a natural question to ask, so let's look into it.

The Theory

Climate science's method of deriving a surface temperature from incoming radiant energy (whose intensity is measured in watts per square meter) is based on the Stefan-Boltzmann formula [1], which in turn refers to a theoretical surface known as a blackbody – something that absorbs and emits all of the radiance it's exposed to. Since by definition a blackbody cannot emit less than 100% of what it absorbs, this fictional entity has no option of drawing heat into itself, for that would compromise its temperature response and thus its thermal emission. Its 100% thermal emission effectively means that a blackbody is a two-dimensional surface with no depth.

The pictures above illustrate how strange an actual blackbody would be. The purple balloon has been converted to a blackbody, which is just as smooth as the real balloon yet reflects no light from its surroundings — which is impossible because it's nearly as smooth as glass. Logically, then, this absolutely non-reflective balloon must be infinitely rough — but once again it can't be,

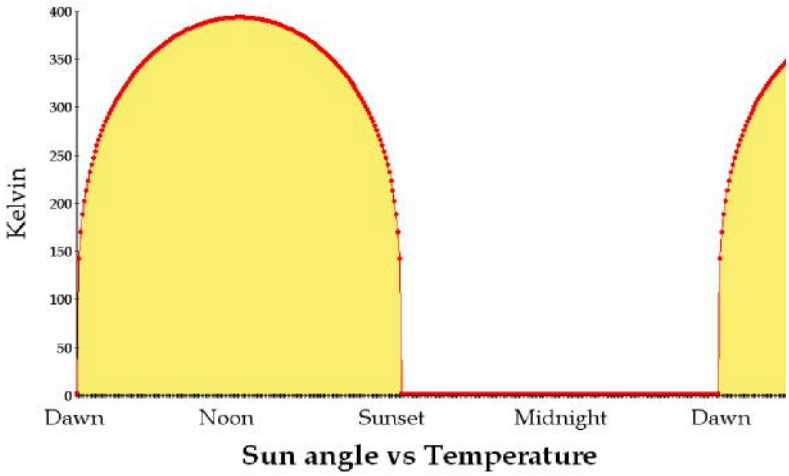
because it is so smooth! In point of fact, a real-life blackbody can only be approximated by a hole, a dark cavity [2] that you can't see into, which is not something we normally regard as a "surface" to begin with.

Treating the earth's surface as a blackbody thus seems very problematic from the start' yet this is *the first assumption climate science makes when predicting the earth's temperature* [3].

Moreover, the principal method for predicting a planet's temperature is surprisingly arbitrary and simplistic. On the premise that a sphere has 4 times the surface area of a flat blackbody disc, the power of solar radiance on a sphere is assigned a value 4 times weaker [4]. In other words, if data indicate that one spot on your earth model receives 956 watts per square meter at solar zenith, you just divide 956 by 4 to get 239, plug that into the Stefan-Boltzmann formula and obtain minus 18°, which supposedly gives you an average temperature for the earth's entire surface, regardless of whether this model rotates or not. [5]

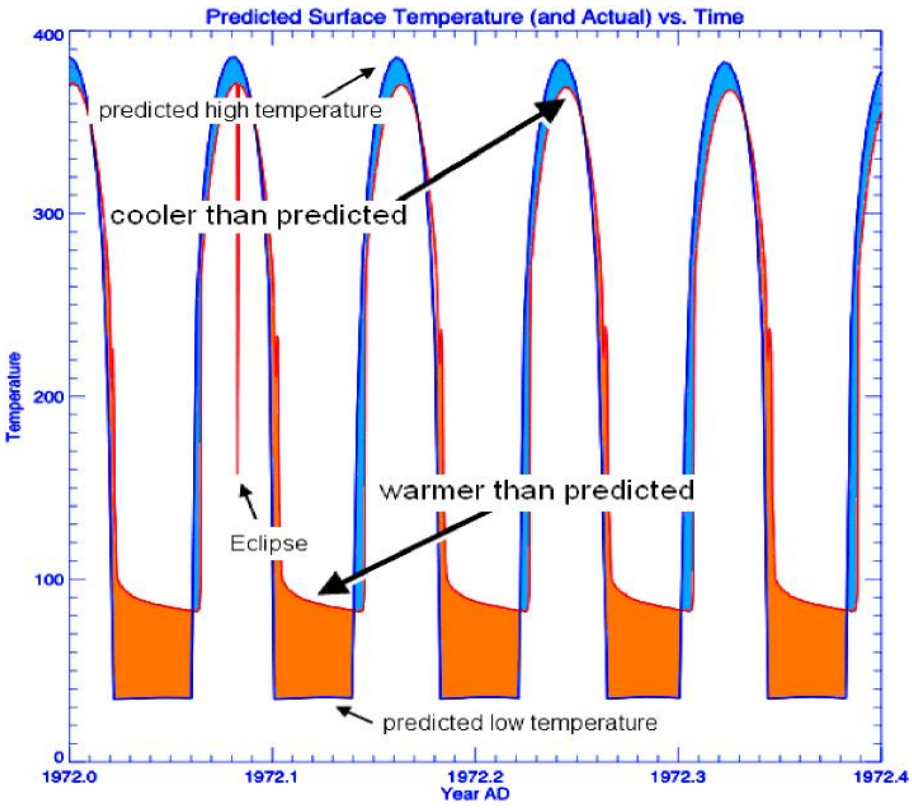
Empirical reality

Since an "average temperature" method provides no information about day and night temperatures within a particular zone, NASA scientists working on the Apollo project had to employ a blackbody sun-angle model to chart the lunar surface temperatures astronauts might encounter. Remember, a blackbody's temperature always agrees with the radiance it's being exposed to. So, after taking albedo (reflectance) into account, the temperature profile for a blackbody moon would look much like this.



As you see, with the first glimpse of sunlight as lunar day commences, the blackbody's surface temperature rises and keeps rising till solar noon, after which the temperature decline mirrors the rise. Having emitted 100% of its thermal energy at every step, however, this imaginary surface has nothing in reserve to last the night, meaning that a rotating blackbody surface theoretically remains at absolute zero *for halfofthe time*.

But now let's look at what really happens. [6]



The filled-in blue and orange zones depict the deviation between observed and predicted temperatures in the NASA experiments. Notice that the peak temperature actually occurs sometime *after* solar noon. The projected low temperature didn't plummet to zero in this case because the radiative contribution of a "full earth" in the moon's night-time sky had been anticipated.

As the chart and the study indicate, actual daytime lunar temperatures were lower than expected because the real moon also conducts heat to the inside rather than radiating all of it to space. Conversely, actual surface temperatures throughout its two-week night were higher than expected because the moon "feeds on" the heat it had previously absorbed. Thus (within the zone in question) the surface of the real moon is roughly 20° cooler than predicted by day and 60° warmer by night, the net result being a surface that is 40° warmer than predicted.

To quote NASA's analysis,

> During lunar day, the lunar regolith absorbs the radiation from the sun and transports it inward and is stored in a layer approximately 50cm thick. As the moon passes into night, the radiation
>
> from the sun quickly approaches zero (there is still a bit of radiation from the earth) and, in contrast with a precipitous drop in temperature if it was a simple black body, the regolith then proceeds to transport the stored heat back onto the surface, thus warming it up significantly over the black body approximation.

All without greenhouse gases.

In other words, the components of a planet's mass itself, rather than an atmosphere, bring about an appreciable difference between its calculated temperature and its actual temperature [7]. Three dimensions count.

Not only do solid surfaces challenge the blackbody premise, however, but gases too. The atmosphere of every planet in our solar system is also 'warmer than predicted'. [8]

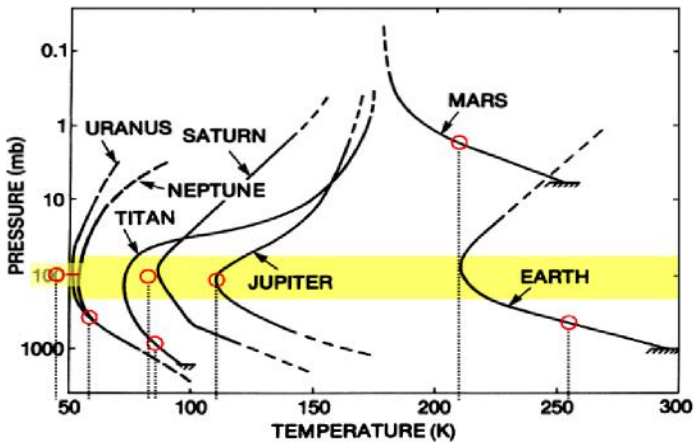
In brief, notice that a cooling atmospheric trend reverses at around 100 millibars for every planet except Venus, which shows a similar reversal except that it begins to warm at a lower pressure. [9]

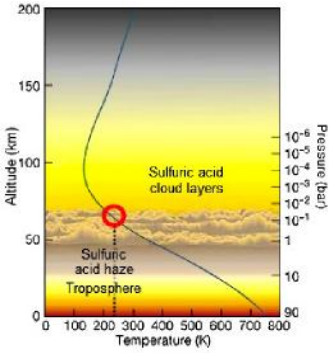
The red circles indicate the temperature assigned to each planet by a blackbody formula [10]. *In every case, as pressure mounts the air temperature exceeds the planet's blackbody estimate.*

A blackbody calculation, then, doesn't prepare us for atmospheric temperatures either, let alone inert solids.

Conclusion

The Earth is not "unusually" warm. It is the application of the predictive equation that is faulty. The ability of common substances to store heat makes a mockery of blackbody estimates. The belief that radiating trace gases explain why earth's surface temperature deviates from a simple mathematical formula is based on deeply erroneous assumptions about theoretical vs. real bodies. These faulty





Venus

assumptions are discussed in detail elsewhere, where they are shown to lead to the 'cold earth fallacy' [11].

Martin Hertzberg, PhD, Consultant in Science and Technology Hans Schreuder, retired analytical chemist

Alan Siddons, former radiochemist

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The Scientific Hoax of the Century

The US Senate hearings on proposed legislation to deal with the "global warming/climate change crisis" were broadcast on C-span last week. While watching, I finally realized that our legislators and government officials were absolutely right to complain about the deficiencies in our nation's science education. For as they made pronouncements about the impending crisis caused by human emission of greenhouse gases such as CO2 even though they knew nothing about meteorology or climatology, I kept shouting at the TV:

"Heal thyselves, you bunch of scientific illiterates!"

For the 25 years that I have studied this controversy, it never ceases to amaze me at how many otherwise intelligent people have been completely duped by the GoreIPCC-Hansen clique of propagandists.

First, consider the argument that "greenhouse gases" such as CO2 absorb infrared energy emitted by the earth and thus "keep the heat in" causing warming of the earth. If one compares the effect of water in all of its forms (polar ice, snow cover, oceans, clouds, atmospheric water vapor) with that of human emission of CO2, the latter is about as significant for the earth's weather as a few farts in a hurricane. But even forgetting that, the earth's infrared energy absorbed by such greenhouse gases is re-radiated to free space as soon as it is absorbed. The notion that the colder atmosphere above can re-radiate that energy back to heat the warmer atmosphere and earth below violates the 2nd Law of Thermodynamics. In the absence of external work, heat flows inevitably from a higher to a lower temperature, never the reverse. But perhaps the Senate can solve that problem and justify the science behind their proposed "cap and trade" legislation to reduce carbon emissions by simply repealing the 2nd Law of Thermodynamics!

In truth, this entire notion of a "greenhouse effect" was shown as early as 1909 to be devoid of physical reality; that is, it simply doesn't exist. But that hasn't prevented the politically driven EPA from classifying various gases according to their potential for greenhouse warming. To summarize:

"The Greenhouse belongs in the Outhouse because it is a load of crap!"

Second, there is the infamous "hockey stick", fabricated from carefully selected tree ring data with a phony computer program in order to show that current temperatures are higher than any experienced over the last 1000 years. The curve has the shape of a hockey stick, flat for past years with a sharp rise during the last few decades or so. The curve was immediately accepted by the IPCC over the strenuous objections of knowledgeable climatologists. Those climatologists knew that the Medieval Warm Period, when the Vikings settled Greenland and grapes grew in Scotland, was much warmer than today and that the evidence for that warm period's presence in all regions of the world was overwhelming.

The IPCC highlighted the fraudulent hockey stick curve in its reports for one reason only: it told them exactly what they wanted to hear. Sound familiar? Remember the Iraqi defector code-named "curve-ball" and his stories to the Bush administration of all the weapons of mass destruction in Iraq.

Thirdly, in addition to the fraudulent temperature "hockey stick", a recent study of the scientific literature has revealed an equally fraudulent CO2 hockey stick curve, which fabricated the myth of a "preindustrial" CO2 concentration of 280 parts per million (ppm) followed by a rapid rise to the current level of 390 ppm. The Gore-IPCC-Hansen clique

then claimed that the increase was due to human emission of CO2. They did so by accepting unreliable ice core CO2 measurements in preference to the hundreds of more reliable direct measurements that were reported in the literature by many distinguished scientists, many of whom were Nobel Prize winners. The real data including all the reliable measurements show several periods in the past 200 years where concentrations increased more rapidly than they did in recent years and that past concentrations in the early 19th century and in the period from 1937-1946 exceeded current levels.

Knowledgeable scientists know that changes in atmospheric CO2 do not

correlate with human emission of CO2; that human emission is a trivial fraction of natural sources and sinks of CO2; that the oceans contain about 50 times more dissolved CO2 than the atmosphere; and that the recycling of CO2 from the tropical oceans where it is emitted to the arctic oceans where it is absorbed, is orders of magnitude more significant that human emissions. The data for the several glacial coolings and interglacial warming cycles over the last 500,000 years always shows that temperature changes precede atmospheric CO2 changes by about 1000 years. This indicates that the temperature changes are driving the CO2 changes, and not the reverse as the GoreIPCC-Hansen clique contend. As oceans warm they emit CO2 and as they cool they absorb CO2.

Also, geologists know full well that there were periods in the earth's past, millions of years ago, when CO2 levels were at least 5 times greater than current levels with only beneficial effects on plant and animal life. To quote a knowledgeable colleague of mine from Norway (who should have been consulted before the Norwegian Parliament made the ghastly mistake of awarding Gore and the IPCC the Nobel Peace Prize): "It is incredible that this wild idea of CO2 being an evil gas in the atmosphere has paralyzed most of the world today, especially since it is the 'gas of life' responsible for photosynthesis that makes the food we eat".

The overwhelming weight of scientific evidence thus proves that the theory that human emission of carbon dioxide and other greenhouse gases is causing global warming or climate change, is completely false. For the record, the recent data show that the average temperature of the atmosphere and the oceans near the surface of the earth has decreased significantly for the last 8 years or so. The average Arctic ice coverage has essentially remained unchanged for the last 20 years, and has actually increased slightly over the last 3 years. The rate of rise of sea level has declined significantly over the last 3 years, and its average rate of rise for the last 20 years is about the same as it has been for the last 15,000 years, since the last glacial cooling ended and we entered the current interglacial warming as the land bridge between Siberia and Alaska started to flood and became the Bering Straits.

The above data and analysis is but the "tip of the iceberg" of all that is available in the scientific literature that reveals the hoax.

So what is left for the global warming/climate change advocates to argue their case? They have nothing but half-baked computer models that are totally out of touch with reality and have already been proven to be wrong. As I indicated in my 1994 paper: "Many interacting regions, both homogeneous and heterogeneous are involved in the complex radiative balance (between the sun and the earth). Unverified models do not realistically represent that balance, and it would be absurd to base public policy decisions on them."

Well, welcome to "The Theater of the Absurd"! The next performance is in Copenhagen this December, when a group of scientifically illiterate diplomats will be meeting to solve the non-existent problem of "climate change" caused by "carbon emissions". Fed by the anecdotal clap trap of know-nothing journalists and environmental lobbyists, they will be proposing draconian measures of world carbon control that will have no effect whatever on the earth's weather but will instead waste enormous amounts of diplomatic and economic resources. Copenhagen will be "a tale told by idiots, full of sound and fury, signifying nothing". The conclusions promulgated by the U.N.'s Intergovernmental Panel on Climate Change (IPCC) are fraudulent concoctions that have already been denounced by many of its scientific members. The IPCC's erroneous conclusions should be thoroughly repudiated lest it continue to discredit the United Nation's legitimate functions: its programs to improve the standard of living of the underdeveloped nations; its programs to combat hunger and poverty; its support of the Conventions against genocide and torture; and its World Court prosecution of war criminals.

Details in support of the above scientific conclusions are to be presented in a future article, as will an analysis of the motives and forces behind the hoax.

In the meantime, think about it and ask yourself the important question: ***"cui bono?"***

(who benefits?)

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Dr. Hertzberg is a combustion research scientist who worked on the prevention of fires and explosions in mines and other industries at the Bureau of Mines in Pittsburgh, PA. He also contributed to our understanding of the fundamental mechanism of combustion in gases and dusts. He currently teaches science and mathematics at various educational institutions, and occasionally consults as an expert on the causes of accidental fires and explosions. He served as a meteorologist in the US Navy and has been studying the global warming issue for the last twenty years.

George Hu, Air Water Energy Engineers, Inc.

AW

Air Water Energy Engineers, Inc.

Massachusetts Department of Environmental Protection
Bureau of Waste Prevention
One Winter Street, 6th Floor
Boston, MA 02108
Attn: Lee Dillard Adams

June 14, 2010

Subject: Geothermal: Key Factors for Government Incentives
- Regulations per Massachusetts Global Warming Solutions Act

Dear Sir / Madam:

We just completed a retro-fit project for a house in New Hampshire by 12/31/2009: Replacing existing propane-fired hot water boiler heating system and conventional air-cooled A/C system with a vertical closed-loop geothermal heating and cooling system. We installed a dedicated electricity meter for the geothermal system. Based on data collected from the meter, for the months of 1/2010 & 2/2010, the owner saved 60% of heating energy bill compared with the same period of 2009.

The impressive energy savings (up to 70% energy savings) that a geothermal heating and cooling system can give the building owner has already been a common knowledge in the geothermal industry and among the general public. The biggest roadblock that has been preventing more wide spread use of geothermal heating and cooling systems, especially for single-family residential houses, is the first cost. As a Professional Engineer, IGSHPA / AEE Certified GeoExchange Designer (CGD) and IGSHPA certified geothermal installer, I have been contacted by many single-family house owners who are interested in geothermal systems for their homes. Most of the cases, my analysis, or the discussions with them, ended with disappointments, because of the higher first cost which makes the Return of Investment too long to justify the application.

Based on the significance of the energy savings and greenhouse gas reductions geothermal systems produce, and the huge number of single-family houses (and also commercial and institutional buildings) that potentially could use geothermal system, it is critical for the government to provide enough incentives for the home owners and other types of building owners, so this great opportunity of reducing our energy dependence on fossil fuel does not get wasted.

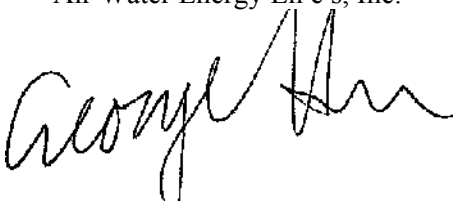
The government's incentives for geothermal systems, in my opinion, should not be smaller, if not larger, than that for the other renewable energy technologies such as solar and wind, for the following reasons:

1. The significance of energy savings (up to 70%) geothermal can give the building owners.
2. The higher first cost of geothermal systems locks a huge pool of owners from using this technology to realize the energy savings.
3. Solar and wind produces renewable energy on one hand, geothermal saves energy on the other. Strategically it makes more sense to attack the energy problem from both directions with equal forces.
4. Geothermal systems actually bring fringe benefits to solar and wind systems. Because solar and wind for most cases produces electricity, and geothermal happens to use electricity (while one unit of electricity input could bring 5 or 6 units of useful energy), I see the great potential of combining solar / wind and geothermal to produce "Net-Zero Energy" systems for a huge number of homes and other commercial buildings. Without a significant energy saving system like geothermal, it would be much harder for solar / wind alone to produce "Net-Zero Energy" systems. In this sense geothermal systems would actually encourage the wider use of solar / wind. As an example, a developer I am currently working with actually is extremely interested in making such a combined system (wind + geothermal) for a project in Cape Cod. Decisions for projects like this will be very sensitive to what the government can do to help making this great concept into reality.
5. Geothermal systems can help solar / wind systems reduce electricity transmission losses, because geothermal systems use electricity at locations where it is produced.

   As an engineer who designs geothermal systems, I see almost on daily basis that the interests on geothermal systems have been spreading. It is great timing, and of great importance, for the government to act quickly and give the owners enough incentives to take this right step toward our energy future.

   If there are any questions, please contact me at your convenience. Very truly yours,

   Air Water Energy En e s, Inc.



George Hu, LEED AP President

rAgeothermal\permitting & regulationslletter to ma dep on geothermal.doc

Stephen H. Kaiser

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To : Massachusetts Department of Environmental Protection, Bureau of Waste Prevention, One Winter Street 6th Floor, Boston, MA 02108,

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From : Stephen H. Kaiser, PhD

Commentson Draft Climate Implementation Plan

The current written public comment period is being conducted in tandem with open public hearings across the Commonwealth to gauge public response to the initial findings and proposals of the ongoing studies of climate change, the Administration's proposed targets and programs, and the relation to recent Legislation, especially RGGI. I testified at the Boston hearing and propose to offer further comments below which are typically unconventional.

COAL : LET IT REST IN PEACE

I believe that the general policy of moving away from coal is a good one. From the beginnings of coal production -- either through obliterating the tops of West Virginia mountaintops or digging it out from underground -- the sorry history of coal extends to the sludge ponds, mercury emissions and poor combustion efficiencies. I do not believe the myths of "clean coal". Except for burning of biomass, there is no fuel less efficient.

Coal is effectively sequestered carbon. That is where it should stay, in the ground, undisturbed. The phase-out plans to end coal power in Massachusetts by 2020 are ambitious, but move in the right direction.

BIOMASS : SAVE IT, DON'T BURN IT

The technical substance of the Manomet report remains intact and substantially unassailed. The Administration appears to have used the climate change issue as a proper platform to view biomass and to change priorities as necessary.

Biomass should not be considered the enemy. It is the burning of biomass which is a bad policy, especially for incredibly inefficient electrical generation plants. With efficiencies in the 15% to 25% range, there is no less efficient carbon fuel. Added to the problem is the wasteful evaporation of 700,000 gallons a day from a 50 MW wet-cooled biomass plant. Manomet claims the payback time for biomass is equivalent to fossil fuel after 50 years (Table 6-1). I believe the equilibrium time is 100 years. However, in terms of reaching carbon reduction goals by 2050, I agree with the Manomet conclusions.

A STRATEGY FOR FORESTS

Mass Audubon has been consistent in emphasizing the important issues of land use change, especially the clearance of forested land for new development. Yet concern over the health and effectiveness of forests seems to be limited to the overriding concern of simply reducing carbon emissions. I believe that healthy forests should be just as much a part of the state's carbon
strategy as reducing carbon emissions.

As best as I can tell, there is no better and more efficient device to remove carbon from the air than a tree. A large tree can represent tons of carbon storage. We should work from that premise.

OTHER CONTRIBUTORS TO CARBON SEQUESTRATION.

In addition to forests, there are other herbaceous source of CO2 consumption, including landscaped parks, street and neighborhood trees, lawns, meadows, etc. Another source of carbon removal is plankton, which are single-celled plants living predominantly in oceans. Plankton account for half of the oxygen produced by land-based plants ... achieved in the top 300 feet of the oceans that comprise 3/4 of the earth’s total surface. Plankton generate oxygen and remove CO2 at 1/3 the rate of soil-based plants.

For a statewide carbon strategy we should consider an area roughly three times the area of Massachusetts, off our coast, with the ability of plankton to consume CO2. Massachusetts and its coastal waters become the study area for climate change. Our ability to have healthy forests with an enhanced ability to sequester carbon should be matched with a complimentary function in the ocean. We should look for ways to improve the health of plankton growth.

AN INITIAL CALCULATION OF CONSERVATION

The beginning point of my assessment is to consider carbon generation in 1990, with total emissions of 94 million metric tons of CO2 a year.

The next step is to make several assumptions about forests and possible improvements :

** Assume the forest carbon value of 8.6 million tons does not include root structures and that roots contain 1/3 of the carbon of the aboveground tree.

** Assume that carbon sequestration from forests applies to the forested 60% of the state and that the remaining 40% of the land is about 15% of the forest total.

** Assume that the carbon sequestration of existing lands could be improved by 20% through more tree planting, and allowance of more trees to reach maturity -- as well as protection against forest clearance and loss of forest land.

For land-based trees, these changes give 8.6 million tons x 1.33 x 1.15 x 1.20 = 15.8 million tons in future potential. For Ocean lands, I assume that science and off-shore protective efforts can enhance plankton growth by 20% : 8.6 x 1.2 = 10.3 million tons

This calculation shows land and sea-based carbon sequestration as 26.1 million tons.

This sequestration contribution is greater than the emissions from electric generation (25.6) and only slightly less than transportation CO2 (28.9). Now assume the effects of doubling the efficiency of the transportation sector (28.9 is reduced to 14.5).

Also improve electrical generating efficiency by half. The Everett generating plant already achieved 43 percent and is state of the art. We should set a goal of 45%. (25.6 x .67 = 17.2)

The overall results of concentrating on three factors results in less generation by 22.9 million tons and greater sequestration by 8.9 million tons .... a total impact of almost 32 million tons.

This quick calculation illustrates a one-third reduction in our effective carbon generation ... from 94 down to 62. The focus in on dealing only with three factors -- plant sequestration, transportation energy and electric generation. All further reductions would be smaller and more difficult to achieve. There will be laws of diminishing returns. That rule means that carbon reductions must be at their highest rate in the near term, and the future reductions must be planned in a way that will recognize how improvements at the end of the process are more difficult than improvements made at the beginning of the process.

The priority of the near term is vital because carbon reductions taken early will have a longer term impact on temperature rise over time, and will actually make our latter efforts to control global warming easier to implement.

IMPROVED SEQUESTRATION THROUGH HEALTHY FORESTS AND CHANGED PRIORITIES

The key element in forest health to to achieve large amounts of carbon storage, accompanied by the maximum growth to allow for such storage. Our present forests where they are in the 50-100 year vintage are not in a prime state of carbon storage. We should be looking at all forests to become fully mature, to have trees in the 100-200 year age cohort as a general rule, with some older and some younger. The ideally productive forest from a carbon perspective would be be around 150 years On average, the future forest would be a much vaster, much deeper and more productive carbon sink than typical forests of today.

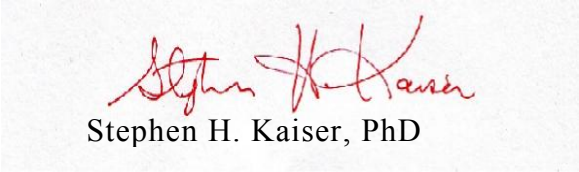
The idea is to spread the existence of trees wherever we can. This strategy would include cities, suburbs and rural areas. An absolute minimum of wood materials would go to burning and to wood stoves. There would be no biomass burning for electrical power generation.

Alcohol fuels have been offered as a "green" alternative through more extensive planting of corn. We should not be doing new planting to create ethanol. Our existing agricultural economy is based on diverting 90% of our corn crop to feedlots, with incredible waste and contribution to other problems such as obesity. The goal should be to divert the excess carbon now in the diet of human beings, and instead use it for alcohol fuels rather than fossil fuels.

We should have a strategy whereby our wood products go for longer-term uses which continue the carbon sequestration, such as homebuilding, and not to destructive uses like biomass power plants.

In recent years state administrators have been considering three issues which, while considered separately, can be seen to overlap in terms of certain issues and possible solutions. These three issues are Climate Change, Forest Management and Biomass Development. During this time there has been an increasing awareness that forests and biomass were an overlapping concern. Priorities had been reversed with forests placed in a subservient position to biomass development. With the increased awareness of climate change, it is time to reverse those priorities and recognize forestry as the leading response to climate policy and as the force that drives biomass policies. This understanding has already begun with the Manomet report.

Sincerely,



Stephen H. Kaiser, PhD

Scott B. Keays, American Lung Association in Massachusetts

Comments on the Commonwealth of Massachusetts' Greenhouse Gas Emissions Target and Draft Climate Implementation Plan for 2020

The American Lung Association in Massachusetts (ALAMA) thanks you for the opportunity to share our thoughts and ideas regarding the Commonwealth of Massachusetts' Greenhouse Gas (GHG) Emissions Target and Draft Climate Implementation Plan for 2020.

While there is debate around how GHG can potentially influence the rate of Global Warming, these toxic emissions undoubtedly lead to a wide range of health problems, particularly for those who already suffer from lung diseases such as asthma and Chronic Obstructive Pulmonary Disease. In the case of Massachusetts, it is important to consider that:

- Nearly 1 out of 10 adults and children in Massachusetts already suffer from asthma. These rates tend to increase depending on how close one lives to an emissions source. They are also among some of the highest rates in the nation.

- Residents throughout Massachusetts are already forced to breathe air that is compromised by high levels of pollution. In fact, the poor air quality found throughout the state has resulted in most counties receiving an 'F" from our 2009 *State of the Air Report* for its high levels of ozone and particle pollution.

As science and research progresses, all too often we find that emissions levels that we once deemed safe, fall drastically short of the levels that are actually needed to protect public health. For this reason we believe that the Commonwealth should set the target GHG emissions level for 2020 at the strictest possible standard of 25 percent below the statewide GHG emissions level in 1990.

The American Lung Association believes that state government can play a vital role in reducing emissions from mobile and stationary sources and in catalyzing the clean energy economy. Below are specific thoughts regarding GHG emissions reductions in the transportation and energy sectors of the economy, which both present significant opportunities for reducing emissions through cost-effective policies.

Transportation

The American Lung Association supports the ideas outlined in the Draft Climate Implementation Plan that would further reduce GHG emissions from transportation; including:

- Implementation of federal and California standards for lower GHG emissions from new vehicles.
- Prioritization of transportation projects that preserve our existing transportation system, support denser "smarter growth", and other forms of transportation (i.e. public transit, walking, and biking).
- Improving the fuel efficiency of our vehicle fleet as well as encouraging motorists to modify their driving as well as adhere to manufacturers' operating and maintenance recommendations.

- Reducing vehicle miles traveled through "smart growth" development, car-pooling, and reducing the number of trips made.

In addition, we believe that the Commonwealth could realize further GHG emissions reductions by increasing enforcement of existing laws that help to reduce vehicle idling and by creating policies that target reducing our state's levels of toxic diesel emissions.

Enforcement of our current idling laws, as well as expanding their scope, has the potential to reduce air pollution and health risks from toxic exhaust, save vehicle operators money on fuel costs, reduce wear and tear on vehicles, as well as, lower health care costs of those most affected by pollution. When considering this opportunity, it is important to bear in mind that (1) an idling engine releases twice as many fumes as a vehicle in motion and (2) for every two minutes a vehicle idles, it uses the same amount of fuel it takes to go about one mile. Thus, significant GHG emissions reductions could potentially be realized simply by enforcing our state's current idling law.

In addition to creating more CO2 emissions than a gallon of gasoline, the US EPA has determined diesel exhaust to be a human carcinogen. Breathing the toxic gases and small particles that diesel exhaust emits can cause lung damage and respiratory problems. In Massachusetts, diesel pollution is responsible for more than 450 premature deaths, 700 non-fatal heart attacks, 9,900 asthma attacks, 13,000 respiratory symptoms in children, and 60,000 days of work lost a year *(Source: Diesel and Health in America: The Lingering Threat—Feb, 2005).* Massachusetts also has the highest health risk from diesel soot in New England. In fact, according to an analysis from the Clean Air Task Force, the average lifetime diesel soot cancer risk for a resident of Suffolk County is 1 in 2,633. This risk is 380 times greater than EPA's acceptable cancer level of 1 in a million.

Fortunately, affordable and effective solutions to reduce diesel emissions are available. Pollution control equipment and cleaner fuels can reduce harmful fine particle pollution by up to 90% by retrofitting with Diesel Particulate Filters (DPFs). State such as California, New Jersey, and New York already require these retrofits and have committed hundreds of millions of dollars to clean up their diesels. These state' cost effective approaches may result in up to $12 in monetized health benefits for every dollar spent on retrofits.

Although Massachusetts has been quite successful at obtaining Federal Diesel Emissions Reduction Act-American Recovery and Reinvestment Act (DERA-ARRA) funding for retrofitting and has been able to have these devises installed on numerous state-owned and private vehicles, there are additional provisions that the Commonwealth could take to reduce GHG emissions as well as protect public health, including:

- Requiring state contracted heavy duty vehicles to use Ultra Low Sulfur Diesel Fuel and install pollution retrofits
- Requiring public works projects to reimburse contractors for retrofitting certain types of off-road equipment (Le. tractors, dozers, crawlers, backhoes, and skid-steer loaders). This will incentivize equipment owners to be first in line for guaranteed reimbursement to retrofit equipment, as well as, create an "even playing field" between large and small businesses to afford the retrofits to keep them competitive for future bids
- Establishing a "Diesel Emissions Reduction Fund" to ensure private fleets retrofit their equipment and maximize the receipts of federal dollars for diesel retrofits.

Electricity/Energy Supply

The Commonwealth has also made impressive strides to incentivize energy efficiency and solar and wind power. The state's ability to catalyze the clean energy economy is certainly evidences by initiatives like Cape Wind; which are critical for creating green and renewable energy that will improve air quality throughout New England, as well as, serving as a model for the nation. ALAMA strongly supports the electricity-related provisions included in the Draft Implementation plan that address our electricity needs without negatively impacting our air quality. These include:

- Adoption of the 2007 federal Renewable Fuel Standard and the eleven Northeast and Mid-Atlantic state's Low Carbon Fuel Standard under development.
- Use of the Renewable Portfolio Standard to require Massachusetts electricity sellers to obtain specific percentages of their electricity from truly renewable sources – such as wind and hydroelectric power – with demonstrable lifecycle GHG reductions.
- Increasing imports of low-carbon electricity through expanding transmission lines that could import Canadian wind and/or hydroelectric power.

However, we are very concerned about the potential expansion of biomass combustion as a source of, so called, renewable energy. It is important to realize that not all renewable sources of energy are clean. Burning wood, like burning coal or oil, will release pollutants that affect both the environment and respiratory health. Regardless of the level set, carbon emissions from burning biomass should not be ignored on the assumption that they are completely counterbalanced by carbon uptake when biomass is grown. In fact, studies prove that carbon uptake falls short of combustion emissions for many fuel sources defined as renewable biomass, resulting in net carbon pollution. Accordingly, if biomass plants are constructed in Massachusetts, these emissions must be accounted for if meaningful reductions are to occur.

In addition to being a source of carbon pollution, biomass emissions contain fine particulate matter, sulfur oxides, carbon monoxide, volatile organic compounds, and various irritant gases such as nitrogen oxides that can scar the lungs. Like cigarettes, biomass emissions also contain chemicals that are known or suspected to be carcinogens, such as polycyclic aromatic hydrocarbons (PAHs) and dioxin. Similarly, emissions created by burning construction and demolition debris (as the biomass energy plant currently proposed in Springfield will, if approved) have the potential to release harmful chemicals such as arsenic, lead, and chromium into the air.

For vulnerable population, such as people with asthma, chronic respiratory disease, and those with cardiovascular disease, biomass and diesel emissions are particularly harmful. Even short exposures can prove deadly. An increasing number of studies are pointing to the direct impact of increased particle pollution levels and an increase in heart attacks. The particles produced by biomass and diesel emissions are extremely small and are unable to be filtered out of our respiratory system. Instead, these small particles end up deep in the lungs where they remain for months, causing structural damage and chemical changes. In some cases the particle can move through the lungs and penetrate the bloodstream.

Our concerns about generating electricity through biomass combustion become even more troubling when you consider how wasteful and inefficient this source of power is. When used strictly for electricity production, biomass plants have an energy conversion efficiency (efficiency of a device that converts one energy form into another) of approximately 20 percent. Another way to state this is that for every 5 cords of wood burned only one actually produces electricity even though all 5 produce pollution.

This statistic is even more alarming when you consider that, when combined, all five biomass plants currently proposed for Western Massachusetts will meet only 1% of the state's energy needs.

In the Draft Climate Implementation Plan, biomass should not be considered a form of low-carbon electricity. In fact, in order to protect air quality and public health, we strongly believe that in order to qualify as a renewable energy generating source that burns biomass to produce electricity, a new facility must meet 5 conditions:

- The facility must be a "combined heat and power facility" that operates at 70% efficiency and meets best available control technology for emissions of particulate matter and nitrous oxides.
- The facility must have "lifecycle greenhouse gas emissions" that are at least 50% less than the greenhouse emissions from a combined cycle natural gas plant, on a per kilowatt hour basis, as measured over 20 years. The lifecycle greenhouse gas analysis required by the proposal shall include direct and indirect land use changes, smokestack emissions, and emissions from equipment used to extract, harvest and transport the biomass.
- The fuel source burned to produce electricity by the power plant (e.g. wood, wood by-products, energy crops, biofuel crops) must be grown, harvested, or otherwise produced sustainably and in a manner consistent with the Commonwealth's environmental goals including greenhouse gas reductions.
- The power plant cannot use construction and demolition debris or construction and demolition debris derived fuel to make its electricity.
- Wood biomass from public or private lands that is burned in the power plant must be harvested in a manner consistent with regulations promulgated by DOER in consultation with the Department of Conservation and Recreation.

As a public health organization, we applaud and appreciate the time and attention Secretary Ian Bowles has given to studying the effects of biomass on our environment and public health. Given the strong association between air quality and health, the American Lung Association in Massachusetts respectfully asks for a moratorium on the consideration or construction of any biomass plants in Massachusetts, until current reviews are completed. Upon completion, we hope that the Patrick Administration will use the findings to develop policies and regulations that will first and foremost protect our state's health and wellbeing.

In sum, the American Lung Association believes that given the technology and the natural resources available to us, we don't believe that anyone should be forced to choose between transportation and energy options and their health. The air we breathe should not make us sick, period. Massachusetts has an enormous opportunity to continue reducing Greenhouse Gas emissions through targeted policies that result in cleaner transportation and energy production. Any policies included in the Draft Climate Implementation Plan for 2020 should take into consideration the potential impact on public health and any related and unnecessary health care costs.

Again, we thank you for the opportunity to testify regarding the Commonwealth of Massachusetts' Greenhouse Gas (GHG) Emissions Target and Draft Climate Implementation Plan for 2020. Any follow up questions may be directed to me at skeaysPlungne.oro or (781) 314-9006.

Sincerely,

Scott B. Keays, MPH
Public Policy Manager
American Lung Association in Massachusetts

Gary Keith, National Fire Protection Association

National Fire Protection Association

1 Batterymarch Park, Quincy, MA 02169-7471

Massachusetts Department of Environmental Protection Bureau of Waste Prevention
One Winter Street 6th Floor
Boston, MA 02108
Attn: Lee Dillard Adams Dear Mr. Adams:

I am pleased to submit written testimony on the Massachusetts Global Warming Solutions Act to offer important information on the environmental effectiveness of home fire sprinklers. I urge you to recommend in your plan that home fire sprinklers be required in all new construction of one and two family homes.

First and foremost, fire sprinklers save lives. There are more than 350,000 home fires a year in the United States, killing more than 2500 people. In fact 80 percent of all fire deaths occur in the home.

While this is the most significant argument for the expanded us of this life-saving technology, there is new and conclusive research on the environmental benefits of sprinklers.

Groundbreaking research conducted by FM Global and the nonprofit Home Fire Sprinkler Coalition concluded that greenhouse gases released by burning buildings can be reduced by 98 percent when automatic fire sprinklers are installed. Furthermore, the research concluded that a fire in an unsprinklered home would negate the environmental benefits of "green" construction.

In addition, the research found that automatic fire sprinklers reduce fire damage by up to 97 percent; reduce water usage to fight a home fire by upwards of 90 percent; and reduce the amount of water pollution released into the environment.

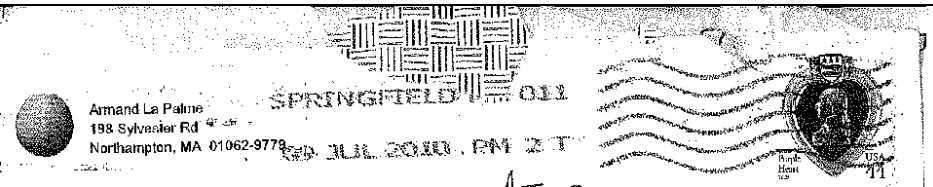
The research involved burning two identical living rooms. One room was protected with fire sprinklers and one was not. The full report is available at www.fmglobal/researchreports.

I applaud the Massachusetts Legislature, Governor Deval Patrick and the Executive Office of Energy and Environmental Affairs for taking action to reduce greenhouse gas. I would be happy to provide additional information on how sprinklers can play a role in this effort.

Thank you.

Gary S. Keith, Vice President NFPA Field Operations

Armand La Palme



Bureau of Waste Mgn
One Winter St 6th Floor
Boston, Ma. 02108

er -

Attn: Lee Dillard Adams -

effects and end results it is going to have on our state forests and private woodlands in general, how harvesting and management are distributed over the landscape over time -

Another important factor is air quality, will the right and closely monitored criteria give us the proper results we are looking for, it's questionable if it will.

Why not start out with a pilot plant and see what the overall results are over time, lets not overdue it, cl would approach this venture with extreme caution.

Our planet is taking enough abuse. We abuse we loose.

Sincerely A.R.L.

André Leroux, Massachusetts Smart Growth Alliance

July 15, 2010

Via electronic mail

Lee Dillard Adams
Massachusetts Department of Environmental Protection
Bureau of Waste Prevention
One Winter Street, 6th Floor
Boston, MA 02108

Re: Comments on Draft Climate Implementation Plan

Dear Ms. Adams:

Thank you for the opportunity to comment on the Commonwealth's Draft Climate Implementation Plan (CIP). The Massachusetts Smart Growth Alliance (MSGA) is highly supportive of the state's leadership on climate change as demonstrated by the Global Warming Solutions Act and encourages its robust implementation.

The Alliance was founded in 2003 by seven leading state organizations to promote healthy and diverse communities, protect critical environmental resources, and support equitable community development and urban reinvestment. We would like to focus our recommendations on land-use, transportation investment, and vehicle miles traveled, as well as some overall implementation concerns.

1. Set the 2020 GHG reduction target at 25% below 1990 levels.

Massachusetts has already become a national leader on climate change and should maintain that leadership by setting the 2020 GHG reduction target at 25% below 1990 levels. The reporting by Eastern Research Group (ERG) indicates that Massachusetts is already on pace to reduce emissions more than 18% below 1990 levels by 2020—terrific news, to be sure, but also an unexpected opportunity. Short-term actions to cut emissions will have a cumulative, and therefore greater, impact over time, making a 25% GHG reduction by 2020 both ambitious and achievable. Furthermore, it will position our state's innovation economy to compete strongly in a low-carbon future.

2. Build support for implementation by working with civil society partners.

Implementing a successful climate change strategy will require public education and outreach, as well as the active engagement of supportive civil society partners. A strong public commitment to transparency and accountability will help prevent the inevitable threat of back-sliding and negative opinion that will be inevitable at different moments over the many years necessary to implement an ambitious climate change policy.

One productive tactic could be to assemble a public-private team, including leading advocates, opinion leaders, and businesspeople, to help advise state officials on implementation and develop a positive and communications strategy that helps make the issue accessible and relevant to more residents.

3. Commit state agencies to reducing vehicle miles traveled (VMT) through their programs and investments.

If Massachusetts residents continue to live further and further away from centers of jobs and services, the need for driving long distances will grow and vehicles miles traveled will increase in the state. This could offset all the gains we may make in vehicle efficiency and cleaner fuels.

It is important for the state to make a concerted effort across agencies to reduce VMT by supporting projects that encourage more compact, mixed land use patterns and increase low-carbon transportation like public transit, walking and biking. Likewise, the state should oppose or de-prioritize projects that will spur the development of far-flung housing and jobs that generate large amounts of VMT. The Executive Office of Administration and Finance could play a key role in coordinating this effort and ensuring that consistent standards are applied across agencies.

4. Increase revenues available for sustainable transportation.

While the sales tax increase last year helped stave off drastic fare increases and service cuts in public transportation, the underlying fiscal issues have not been addressed. The MBTA's finances need help, whether in the form of new revenue sources or by the state assuming some of the T's crushing debt burden related to the Big Dig. Opportunities for new revenue, particularly user fees, need to be pursued aggressively. One example would be to increase vehicle registration fees by $10.

5. Increase the gas tax in the short term but phase to a VMT fee in the long term.

The gas tax has not been increased since 1991 and should be adjusted to reflect inflation. A series of modest increases programmed over several years may be the most feasible. Of course, gas tax revenues have been decreasing nationwide precisely because of the increase in vehicle fuel efficiency, and hopefully will continue to do so. In the long run, a small fee on vehicle miles traveled would align best with a comprehensive climate change strategy, rewarding behaviors and development that encourage carbon savings. Massachusetts can begin now with a voluntary VMT fee pilot project to set the stage for a wide-scale implementation.

6. Spend transportation dollars more effectively.

The era of mega-transportation projects may be over in Massachusetts. Now we have to take ourselves out of the billion-dollar mentality and leverage our existing funds more creatively to provide more service to more people. This may mean shifting away from regional bus service towards shuttle circulators connecting employment, housing, and shopping areas. It could mean streamlining regulations for bike paths in order to decrease construction costs. It could mean using more road money for pedestrian improvements. MassDOT should assemble a high-level advisory team to support their sustainable transportation efforts and introduce new concepts that may be challenging to the status quo.

7. Reform the state's land-use policies.

In order to create healthy, walkable communities, the Commonwealth will have to make it easier for good development to occur. Market studies and demographic trends all indicate that there is a growing need for modest-sized, quality affordable housing in vibrant neighborhoods. However, the situation in Massachusetts makes it near impossible to respond to that market demand because of local and state regulations.

The Commonwealth's zoning laws have been called the most outdated in the nation. Although we are a state that prides itself on its villages, town centers, and neighborhood squares, we have in most instances outlawed the new development of such great places. A glance at a zoning map of the state reveals that the overwhelming majority of municipalities require homes to be built on minimum lot sizes of one acre or larger. Not only is this not walkable, but it is destroying our landscapes, increasing our dependence on petroleum, generating new expensive infrastructure that serves fewer people, and not historic.

There are a number of measures that the state could take. One would be to establish a state office of planning that supports local and regional planning initiatives and encourages regional coordination. The Commonwealth needs to articulate some land-use goals, and the first step could be to reaffirm in statute the Sustainable Development Principles and require state agencies to implement them in their programs and in their funding decisions. As mentioned in bullet #3, this function could be housed in the Executive Office of Administration and Finance.

The Legislature has the opportunity to pass comprehensive zoning reform, which could make the rules of development more predictable while providing cities and towns with tools to encourage development in sensible locations and preserve areas of natural resources. Secretary Greg Bialecki has played an instrumental role in moving zoning reform along, and future administrations should continue to make it a high priority until it is passed.

Ultimately, the Commonwealth will have to tackle the perverse competition for property tax dollars that exists in the state among municipalities. Right now, there are strong incentives to prevent population growth and new families in particular because of the perceived drain on municipal services; and strong incentives to welcome car dependent commercial development because of the net positive effect perceived on the town budget. Encouraging good planning and regional cooperation would be a good first step toward addressing this challenge.

Thank you very much for the opportunity to share our feedback with you. We stand ready to help support your implementation efforts.

Sincerely yours,

André C. Leroux

André Leroux
Executive Director

Stephen Long, The Nature Conservancy

The Nature Conservancy in Massachusetts

205 Portland Street, Suite 400

Boston, MA 02114-1708

tel [617] 227.7017

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nature.org/massachusetts

MassDEP
1 Winter Street, 6th Floor
Boston, MA 02108

Submitted via email to: climate.strategies@state.ma.us

July 15, 2010

Dear Ms. Dillard Adams:

Thank you for the opportunity to provide comments on the Commonwealth of Massachusetts' Draft Climate Implementation Plan: A Framework for Meeting the 2020 and 2050 Goals of the Global Warming Solutions Act (GWSA). We applaud the Executive Office of Energy and Environmental Affairs (EEA) for its leadership in developing and implementing public policies and funding for climate change mitigation strategies. We greatly appreciate the opportunities to provide input into the through the stakeholder process and public hearings.

The Nature Conservancy is an international, nonprofit conservation organization. Our mission is to preserve the plants, animals, and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive. Our work is carried out in all 50 states and more than 30 countries and is supported by 30,000 members in Massachusetts and over one million members worldwide.

The Conservancy has actively participated in the process leading up to the Mitigation Plan, including: advocating for the GWSA, testifying on the identification of sources of greenhouse gases (GHGs), providing recommendations on mitigation strategies through involvement in a subcommittee of the Climate Protection and Green Economy Advisory Committee, and recommendations on adaptation strategies through seats on the Climate Change Adaptation Advisory Committee and Natural Resource subcommittee. Throughout the process, the Conservancy has provided EEA with expert staff and science-based data to demonstrate how forests can actively remove carbon dioxide.

Nature Conservancy Recommendations

1. Adopt a goal of 25% reduction of greenhouse gas emissions below 1990 baseline by 2020

The Massachusetts Chapter of The Nature Conservancy supports the 25 percent reduction goal for the year 2020. This is close to the level recommended by the Intergovernmental Panel on Climate Change (IPCC) to reduce carbon dioxide in the atmosphere to reach the IPCC recommended concentrations of GHGs and avoid the worst climate change impacts. This level of reduction will be necessary to meet the goal of 80% reduction of greenhouse gases by 2050.

2. **Include avoided deforestation as a greenhouse gas emission reduction strategy in the implementation plan**

The Forest, Agriculture, Marine, and Land Use Change Subcommittee, on which the Conservancy served, recommended that the Commonwealth's Mitigation Plan recognize the important role that forests can play as part of the Commonwealth's climate strategy. The Subcommittee recommended public policy and funding measures ranging from economic incentives (a buy local wood campaign and mitigation funds for forest conservation and restoration) to Smart Growth strategies (revising land use planning to encourage density and infill development, targeting municipal assistance grants to discourage sprawl) to reduce forest loss and encourage community-oriented development.

The EEA report that followed the Subcommittee's work, "Cost-Effective Greenhouse Gas Mitigation in Massachusetts: An Analysis of 2020 Potential," did not include an evaluation of the Subcommittee's recommendations on the basis that they provide small GHG reductions in comparison to those offered by transportation, buildings and energy supply. The report included a footnote on forest strategies: "To the extent that an analysis of…the potential in the biogenic (primarily forestry) sector, is completed over the next several months, the potential reductions from these sectors may also be included in the implementation plan to be released…"

The Conservancy recommends that EEA conduct a more thorough examination of the Subcommittee's recommendations and include avoided deforestation as a mitigation strategy in the final Mitigation Plan. As described below, public policies and funding supporting avoided deforestation would provide significant mitigation and adaptation benefits with a high likelihood of success in a cost-effective manner that address time-sensitive factors using exiting EEA programs and funding.

Forests offer the Commonwealth a significant, effective and proven means of achieving its emissions reductions goals. Since forests offset approximately 10 percent of the Commonwealth's GHG emissions annually, we should be protecting that means of absorbing carbon.

The latest scientific and economic research provides evidence that incentives to avoid converting forested land to developed land or a requirement to mitigate such conversion are the highest-impact, most cost-effective way to use forested land to help reduce greenhouse gas emissions. Costs incurred now yield benefits every single year as long as forested land remains forested and is available to absorb carbon.

According to the "Statewide Greenhouse Gas Emissions Level: Final 1990 Baseline & 2020 Business As Usual Projection," land use conversion caused emissions of up to 2.2 million tons of CO_2 per year in 1990. While the rate of deforestation has decreased in recent years due to the current economic downturn, there is reason to think that rates will increase. Over 220,000 private landowners own 78% of forest land in Massachusetts. According to the U.S. Forest Service's National Woodland Owner Survey, these private landowners are aging and are looking for options with regard to their land, such as sale to developers. We should address this opportunity to provide private forest land owners with incentives to conserve their land before it is too late.

A McKinsey & Company report ("Reducing Greenhouse Gas Emissions: How Much at What Cost (2007)) identified a time-sensitive economic opportunity: "The offset potential associated with forests and agricultural lands could serve as a "bridge" until emissions can be reduced elsewhere in a more cost-effective manner." In other words, some sectors of the economy may not be able to implement GHG reduction immediately and may be seeking market-based offset opportunities such as those provided by avoided deforestation.

Conservation of intact forest ecosystems not only provides mitigation value, but provides co-benefits for adaptation, and is a high priority of EEA's Climate Change Adaptation Advisory Committee draft recommendations (on which the Conservancy served). Intact forest systems ensure clean and abundant drinking water; absorb projected heavy precipitation events and thereby reduce flooding; provide local forest products, which reduces emissions associated with transporting imported wood and fiber; and provide cooling of terrestrial and aquatic ecosystems and built infrastructure, both of which experience increased warming as forests are converted and impervious surface increases. All of these adaptation "services" are low or no cost, and replace high cost adaptation strategies necessary to maintain built infrastructure, public health and safety, and local economies.

3. Use forest strategies to enhance emissions reductions from transportation, building, and energy supply strategies, while adding adaptation benefits

Some strategies currently in the Mitigation Plan could achieve even greater emissions reductions by using existing public policies and funding to include avoided deforestation and tree planting. For example, the mitigation strategy of transitioning to 80% of new homes in Smart Growth developments could reduce greenhouse gas emissions far more than the 1.6 million tons of CO2 per year from reduced vehicle mileage. If Smart Growth incentives focused on avoiding deforestation by reducing building footprints, retaining mature trees near houses, and reducing lawn size, the realized benefits could be much greater, with perhaps as many emissions reduced from avoided deforestation as from reduced vehicle miles.

EEA should also consider including tree planting to existing mitigation strategies. Trees planted in urban and suburban areas provide minor carbon storage benefits in the short term and potentially larger carbon benefits in the long term, when the Commonwealth may be struggling to achieve the mandated 80% reduction in greenhouse gas emissions from 1990 levels. Planting trees in urban and suburban areas may help to further decrease vehicle miles traveled by providing opportunities for walking and recreation closer to home, a benefit recognized by the Patrick Administration's Gateway City Parks Initiative. Tree planting provides cost savings on cooling costs by shading houses and streets, an important adaptation benefit as well as a direct reduction in electricity used for heating and

cooling. At the same time, adaptation benefits of tree planting include longer retention of and filtering of stormwater runoff, and decreased erosion, both of which improve water quality. There are an estimated 184,000 "plantable" acres of urban and suburban land in Massachusetts (subtracting impervious surface and estimated existing tree cover from acres of developed land). The guidelines for afforestation offsets under the Regional Greenhouse Gas Initiative provide a starting point for deciding which tree planting efforts provide additional and verifiable carbon benefits as well as adaptation benefits.

Finally, the potential for funding many of these forest carbon-related mitigation initiatives already exists in the Environmental Bond (Chapter 312 of the Acts of 2008) which provides authorization for capital funds for the following: enhancing forest-related ecosystem services and carbon sequestration (DCR line item 2800-70220), planting trees and urban forestry (EEA line item 2000-7015), and mitigation and adaption to climate change (EEA line item 2000-7025).

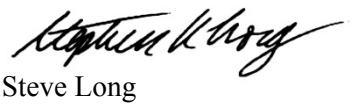
Conclusion

Given the proven science and economics and existing public policies and funding to address avoided deforestation, the Conservancy believes EEA has sufficient time to evaluate and include forest carbon policies in the Mitigation Plan, further enhancing the benefit of existing transportation, building, and energy supply mitigation strategies.

Several relevant references are included at the end of this letter. Research, analysis and policy development could be done with a low level of effort and in time to include it in the final report.

The Conservancy stands ready to assist in providing its expertise and resources to help EEA research, evaluate, develop and implement public policies and funding related to forest carbon and climate change mitigation and adaptation. We look forward to continuing our collaboration with EEA. Thank you for your time and consideration.

Sincerely,



Steve Long
Director of Government Relations

Supporting references:

Strategies to use forests to mitigate climate change were included in "A Synthesis of Science on Forests and Carbon for U.S. Forests" (Ecological Society of America Issues in Ecology #13, Ryan et al. 2010). The authors concluded that current scientific research shows that the single greatest step that can be taken to use forests and natural infrastructure to mitigate climate change is to retain all existing forests. The authors also recognized the benefit of forest management strategies: decreasing carbon loss by lengthening the interval between harvests and/or decreasing harvest intensity, using controlled burning and mechanical treatments to reduce fire threats, and control of pests and pathogens.

The Manomet Center for Conservation Sciences “Biomass Sustainability and Carbon Policy Study” (2010) compared several forest management techniques in Massachusetts forests and concluded that there is no management or use that can store more carbon than leaving forests intact and allowing them to mature.

“Terrestrial Carbon Sequestration in the Northeast: Quantities and Costs”, (The Nature Conservancy, Winrock International, and The Sampson Group, 2007) estimates that urban forests in Massachusetts sequestered the equivalent of 1.6 million metric tons of CO2 per year between 1987 and 1999, providing a starting point for measuring the impact of expanding (or reducing) the amount of urban forest.

“Conventional development versus managed growth: the costs of sprawl” (Am. J. of Public Health, Burchell and Mukherji 2003) estimates that implementation of Smart Growth strategies could reduce the amount of deforestation by 21% when compared with conventional development.

Mindy S. Lubber, Ceres

Lee Dillard Adams
Massachusetts DEP, Bureau of Waste Prevention
One Winter St, 6th Floor
Boston, MA 02108
RE: Commonwealth of Massachusetts Draft Climate Implementation Plan

Dear Ms. Adams,

The Global Warming Solutions Act is evidence of Massachusetts' commitment to leadership on climate, clean energy, and sustainable business. Ceres commends the ongoing efforts by the Patrick administration to implement this statute in a way that promotes a sustainable, prosperous future for Massachusetts and the world.

Ceres is a national non-profit coalition of investors, environmental groups, and other public interest organizations working with companies to address sustainability challenges, such as global climate change. Ceres directs the Investor Network on Climate Risk, a group of more than 80 institutional investors from North America managing $9.8 trillion in assets, dedicated to promoting better understanding of the financial risks and opportuniti es posed by climate change.

Ceres has been based in Boston since its founding in 1989.

Summary:

Ceres endorses the 25% target for 2020 and urges the Commonwealth to seek to exceed it, since our economy will benefit and climate leadership is needed. We support aggressive R&D, low-carbon fuel standard, electric vehicle infrastructure, pay-as-you-drive insurance, energy labeling, energy efficiency measures like utility energy efficiency programs, PACE bonds, stronger RGGI and RPS targets, and a phase-out of coal power by 2020.

1. 2020 Goal:

Ceres urges the Secretary of the Executive Office of Energy and Environmental Affairs to select the highest permissible target, 25% reductions in emissions below 1990 levels. In fact, given the results of the "Analysis of 2020 Potential," setting a target below 35% may deprive Massachusetts of potential economic benefit. Therefore, Ceres urges the Administration to consider ways to exceed the target, whether via existing authority or by seeking new legislation. In our view, there are two key reasons to set a strong goal for emissions reduction: economic benefit and national leadership.

First, setting a high goal will **help Massachusetts' economy** in the short and long run. A strong target for emissions sends a clear signal to the business and investor community that Massachusetts intends to lead the way to an innovative clean energy future. Our work with the

Investor Network on Climate Risk, a $9.8 trillion network of investors coordinated by Ceres, has made it clear that investment decision-making, both in energy and throughout the economy, is hampered in the absence of a clear reduction target.

Kevin Parker, Global Head of Asset Management for Deutsche Bank, explained the global scenario in a March 2010 report:

> "governments are at last understanding that they are in a race to secure a leading position in the emerging global low-carbon economy. Countries with more TLC – transparency, longevity and certainty – in their policy frameworks will simply attract more investment and will build new industries, technologies and jobs faster. We are confident of this because it's already happening in countries such as Germany and China."

Furthermore, the 2010 Clean Edge report concludes that Massachusetts' steps thus far have drawn venture capital, but the state "could continue to show leadership in carbon reduction strategies by legislating a more aggressive individual GHG reduction target."[2]

Setting an in-state target works in two ways to help Massachusetts' economy: it further identifies Massachusetts as a leading environment for investment in clean technologies via certain, credible policy. Second, it increases the pressure for nationwide policy, which would create a positive investment atmosphere in clean energy – where Massachusetts stands to benefit greatly.

Massachusetts already has impressive leadership in clean energy technologies, with national innovation leaders in advanced batteries, high-efficiency biofuels, solar panels, wind turbines, and smart grid solutions – A123 Systems, EnerNOC, Konarka, Ze-Gen, GreatPoint Energy, Beacon Power, and General Compression. However, according to a poll of in-state clean -tech companies in early 2010, the number -one barrier to further growth is a lack of capit al, which is held back nationwide.Investment driven by a strong target will help Massachusetts, and America, regain the lead in the clean energy innovation race, strengthening these companies, growing jobs, and attracting business to the state. But international competition threatens to draw clean-tech business abroad, especially as federal action stagnates.

Furthermore, a strong target generates innovation, the all-important intangible factor that drives growth. In order to generate conservative estimates, the "Analysis of 2020 Potential" report does not take technological change and declining prices for existing technology into account – but historically, innovation has been a major factor in economic prosperity. Investment -driven innovation will lower the costs of meeting long-run emissions targets, as more strategies become cost-effective. It will position Massachusetts to benefit from national climate policy, and local businesses will export this knowhow to the rest of the world.

Because of the market barriers to energy efficiency, a strong target will save money, helping businesses use capital more wisely. A recent McKinsey & Co. report explains that a "comprehensive and innovative approach to unlock" these benefits is required, and innovative government regulations and market facilitation can go a long way toward correcting this failure.And investment unleashed by a strong target will streamline our economy. With less money wasted on fuel, spending will be redirected toward Mass. businesses and services, where it multiplies throughout the local economy.

Finally, a growing clean-energy sector and an efficient economy will allow Massachusetts to use less energy and produce more of it here, making the state less dependent on imported energy. Without any in-state fossil fuel sources, energy prices are subject to price volatility and supply uncertainty. One quarter of Massachusetts' electricity comes from burning coal, which sends $252 million out of state per year, the vast majority on coal imported from Colombia.[5] Half of the Commonwealth's electricity and nearly half of household heating is powered by natural gas, piped in from other states or via tanker from overseas. Switching to renewable sources and reducing use reduces vulnerability to volatile energy prices.

Second, an aggressive reduction target will **set a high bar for policy**, which is essential to avoid runaway climate change and set investor certainty throughout the many sectors and supply chains affected by climate change. The 2020 goal is a key opportunity to set a standard for national and global policy that keeps global temperatures at a safe level. As in the landmark 2007 case *Massachusetts v. EPA*, state leadership can jump-start federal action, and help break the international climate-treaty logjam.

It is Ceres' view that the range of possible consequences of global climate change warrants strong action to avoid the worst-case scenarios, while benefiting our economy in the long and short run. Massachusetts' exposure to impacts of climate change – from more floods to suffering fisheries – justifies an aggressive target . Compounded with the impacts on more vulnerable populations, the global economy, and international stability, the impacts call for strong action worldwide. A December 2009 letter, signed by investors representing $13 trillion and organized by Ceres , urges developed country targets of 25-40% reduction by 2020, because high targets "give investors greater confidence that countries will put in place timely and specific action plans for meeting long-term targets." [6]

Massachusetts also has several key advantages that make ambitious reductions possible at low cost: high energy prices, no fossil fuel sources, and old building stock. As a national technology and education leader, the Commonwealth has the knowledge capital to innovate. Massachusetts is uniquely positioned to commit to aggressive emissions reductions, which will help spur U.S. and international action.

2. Growing the Clean Energy Economy:

Ceres has already contributed to the recommendations from subcommittees on Buildings & Energy Efficiency, Transportation & Land Use Planning, and Low Carbon Energy Supply. However, we highlight several noteworthy strategies below.

- On the global scale, many technological breakthroughs are needed – the "silver buckshot" of innovation. Massachusetts should continue to emphasize research, development, and deployment of solutions to see which develop into world-changing technologies.
- In the transportation sector, Massachusetts should move forward aggressively to develop a framework for a Low-Carbon Fuel Standard. Businesses and investors endorse this

approach because it provides regulatory certainty to the market for cleaner fuels, such as second-generation biofuels, and facilitates the transition to low carbon fuels.

- Electric and alternative fuel vehicle infrastructure needs to be incorporated into state planning.
- Pay-as-you-drive (PAYD) car insurance should be another state priority, either incentivizing its adoption, or requiring it as an option for insurance providers. Ceres' partners endorse this model because it saves money for consumers, creates incentives not to drive, saves municipalities and consumers money, and cuts emissions.
- In buildings, Ceres advocates for strong green labeling requirements on residential and commercial buildings.
- Programs to capture energy efficiency gains, like the successful implementation of municipal-level PACE financing, need to remain a priority.
- Ceres applauds Massachusetts' progress on the Renewable Portfolio Standard and participation in RGGI. This success should be expanded via stronger RPS goals and RGGI targets.
- We also support a goal of phasing out coal-powered electric generation that does not capture and store CO2 in the Commonwealth by 2020, since coal is particularly culpable for global greenhouse-gas emissions. This aggressive move will signal the serious commitment to clean energy solutions in Massachusetts.

3. Time Horizons:

Focusing on cost-effective practices, while essential to maintaining public support, needs to be balanced with long-run concerns. The solutions that appear least cost-effective will still be needed to reach long-run goals, so it's essential to get a head start, and work to drive down their price. Furthermore, because the analysis of costs does not incorporate social costs of carbon emissions, we urge keeping in mind that cost-benefit calculations change drastically if carbon is priced.

Ceres advocates deploying capital to capture energy efficiency benefits aggressively in the near-term, since it brings a higher return on investment, and it will help determine needed levels of electric and other energy production in the future. This is particularly important in the first few years, so that the Commonwealth can make meaningful, low-cost reductions, achieve economic benefits for its citizens, and provide excellent leadership for the nation. As technologies emerge that better compete with existing supply, the state should aggressively increase their deployment. Pursuing a broad strategy for emissions reduction in Massachusetts will increase our ability to innovate, bringing important economic gains to the Commonwealth, while advancing the global ability t o reduce emissions.

When weighing costs and benefits over time, Ceres urges using a low social discount rate. Like a long-term investor, the Commonwealth needs to pass on a strong base of assets to future generations. Bearing in mind the long-term, intergenerational impacts of climate change on the Commonwealth and the nation, a strategy that undervalues the security of generations to come is not prudent. The latest federal guidance on intergenerational carbon rates of 2.5, 3, or 5%. [7] Ceres recommends using 2.5% or lower, reflecting long-term uncertainty and investors' strong warnings that climate damages are unlikely to correlate to positive market returns. Furthermore, even this rate may fail to account for intangible benefits of natural capital, so discounting should be used with care.

4. Criteria

Ceres appreciates the careful work that has been required in forming criteria to guide state action thus far. We would add a criterion that highlights the role of state leadership in generating federal or regional policy.

5. Linkage with Adaptation Planning

We applaud the Commonwealth's ongoing study, through the Climate Change Adaptation Advisory Committee, of the interface between adaptation and mitigation planning. While by no means a comprehensive assessment, we highlight emissions mitigation strategies that affect water impacts of climate change – which is already driving more frequent flooding in Massachusetts.

- At the building scale, both energy efficiency upgrades and resilience to flooding will likely call for changes in building codes, which ought to be evaluated in coordination and implemented in tandem.
- Funding community programs to incentivize low-impact development and reduction of impervious surfaces on private property helps avoid street flooding, property damage, and water-quality problems resulting from combined sewer outflows (CSO). These programs also present co-benefits: reducing the energy required to treat stormwater that enters the sanitary sewer system and helping utilities to avoid CSO events and meet Clean Water Act standards.
- Freshwater wetlands can be an economical solution to persistent floods and surface water quality problems. Leading water infrastructure engineering firms now regularly implement constructed or restored wetlands in water delivery and treatment systems. This approach offers the co-benefit of fostering native species, improving surface water and drinking water quality, and supporting recreational use .
- Similarly, coastal wetlands offer protection to communities at risk of flooding from storm surge. The Commonwealth should promote the use of wetlands as infrastructure in communities coping with persistent flooding and water quality impairments.

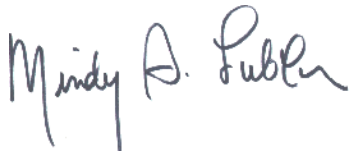
Community, municipal, and state planning should recognize these important relationships. Because of potential savings under joint implementation, we suggest further research and recommend prioritizing mitigation options with co-benefit in reaching adaptation goals, especially with long-run planning consequences.

Conclusions

Ceres commends Massachusetts' leadership on climate change solutions. The Global Warming Solutions Act puts Massachusetts among the national leaders in catalyzing a clean energy economy, innovating global solutions, and investing in the future. However, selecting any goal weaker than 25% may compromise the progress already underway, and there is much to gain from a still stronger target. We urge legislative and executive efforts to set the bar higher for Massachusetts.

We thank the Patrick Administration and the Executive Office of Energy and Environmental Affairs for fostering this open discussion and for pushing toward a sustainable future in Massachusetts.

Sincerely,



Mindy S. Lubber
President, Ceres

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[1] Deutsche Bank Climate Change Advisors, "Global Climate Change Policy Tracker," March 2010. http://www.dbcca.com/research

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[5] Union of Concerned Scientists, "Burning Coal, Burning Cash: Massachusetts' Dependence on Imported Coal," May 2010. http://www.ucsusa.org/burningcoalburningcash

[6] "2009 Investor Statement on the Urgent Need for a Global Agreement on Climate Change," available http://www.ceres.org/Page.aspx?pid=1126

[7] Interagency Working Group on Social Cost of Carbon, United States Government, "Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866," February 2010. http://www.epa.gov/otaq/climate/regulations/scc-tsd.pdf

Stephen Mabee, Massachusetts Geological Survey

Written Testimony on the Draft Climate Implementation Plan: A Framework For Meeting the 2020 and 2050 Goals of the Global Warming Solutions Act

June 11, 2010

My name is Stephen Mabee. **I** am the State Geologist and Director of the Massachusetts Geological Survey for the Commonwealth of Massachusetts. The Survey is located at the University of Massachusetts, Amherst in the Department of Geosciences.

I applaud the Commonwealth's efforts to develop a long-range plan to curb GHG emissions. We are certainly moving in the right direction. However, there is one item that is conspicuously absent from the draft implementation plan that will certainly accelerate the Commonwealth's ability to meet or exceed the 25% reduction in GHG below 1990 levels by 2020 AND stimulate the economy and create jobs. That missing item is geothermal ground sourced heat pumps (GSHP).

I attended the public hearing in Springfield on Wednesday, June 9, 2010 and listened to Eastern Research Group (ERG) list the criteria for cost effective greenhouse gas mitigation. These criteria state that any technology employed to mitigate GHG must provide quantifiable results, be cost effective, be based on existing technology and have the ability to affect sectors of the economy that can have a significant impact on GHG reduction, among others. GSHP meets all of these criteria.

GSHP technology has existed for decades. It is a proven technology and continues to improve. It is also cost effective. One unit of electricity needed to extract heat from the earth generates 3 to 4 units of stored energy from the earth; a 400% to 500% efficiency. GSHP can also provide 50% to 60% of domestic hot water through the use of a desuperheater. Success of GSHP is easily measured by the reduction in fossil fuel consumed, pounds of GHG removed and kilowatt hours used. GSHP addresses GHG emissions in our building stock and energy supply sectors, which represent a large proportion of the Commonwealth's GHG contribution. Accordingly, there are significant and measurable benefits afforded by GSHP.

There are certainly other advantages to GSHP that should be mentioned. GSHP systems use

25% to 50% less electricity than conventional heating and cooling systems. They generate no GHG emission themselves. Return on investment can range from 3 years to 14 years depending on fuel prices and the type of heating system the GSHP is replacing. GSHP works when the sun is not shining and the wind is not blowing.

The other main advantage of promoting and utilizing GSHP in GHG reduction is the positive effect it will have on the economy. The unique element of GSHP technology is that it requires input from many disciplines as well as support from industry. HVAC engineers are needed to design duct work and heating and cooling loads. Mechanical engineers are needed for designing and improving heat pump functionality. Electricians and plumbers are required to connect systems. Pump installers and suppliers

are needed along with pipe manufacturers. Well drillers are employed to install geothermal wells in consultation with geologists and geotechnical engineers, as well as industries and suppliers that support the well drillers (e.g., casing, drilling mud, grout, etc.). Each of these disciplines and industries will benefit and create jobs if there is a concerted effort to promote GSHP installations in Massachusetts. Interestingly, installation of GSHP wells is the only activity keeping some well drillers in business during the current recession.

I sense there is a reluctance at the state level to endorse GSHP due to the higher initial costs, longer returns on investment (depending on fuel costs), some well publicized failures, and the fact that some minimal electric power is still needed to operate the system. I would argue that there is no other alternative energy option as efficient and cost effective as geothermal.

There are four things the Commonwealth can do to assure achieving its 2020 and 2050 goals for GHG reductions and promoting a growing clean energy economy:

1. **Recognize GSHP on an equal basis with solar, wind and other renewables and promote its use.** Tapping the stored energy in the earth can save homeowners 40% to 70% in heating costs and 30% to 50% in cooling costs compared to conventional systems, reduce GHG emissions in the process and promote jobs and R&D in the GSHP field. GSHP does not have the political, aesthetic, or environmental issues attendant with wind power and it can be done anywhere.

2. **Promote training, standards development, licensing, and regulations for GSHP installers and education for the consuming public.** One of the main problems with GSHP in its present state is that it takes many disciplines working together and communicating clearly with one another to make a successful project. For example, an HVAC engineer knows how to evaluate heating and cooling loads but knows very little about what type of ground loop is needed to meet the demand. Similarly, a well driller knows how to install geothermal wells but does not necessarily know how to determine how many wells are needed to provide the ground exchange to meet the demand. Accordingly, there are knowledge gaps on the technical side that need to be filled through training and education to level the playing field and open the lines of communication among the various disciplines. The public, who will benefit most from a successful GSHP installation, in many instances, is unaware that this form of energy even exists and if they do, they do not know who is a reputable installer. The Commonwealth can close this knowledge gap by supporting training and education.

   The Massachusetts Geological Survey, with the help of Haley and Aldrich, MA DEP and Theimonexus, has organized a training workshop called "Geothermal Heat Pumps: Concept to Completion" designed to train professionals in the basics of ground source heat pump design and installation that is specifically geared to Massachusetts' geology and regulatory environment. The inaugural workshop was held in March 2010 with 25 participants. A second two-day workshop is planned for December 2010 in Worcester.
   In August 2010, we will be running a one-day workshop at Middlesex Community College designed for facilities managers. One of the outcomes of the March seminar was the idea of starting a New England Geothermal Professional Association (NEGPA) where professionals can meet to exchange ideas and the public can find information about GSHP and locate authorized contractors. This is a grass roots effort that is under development. These kinds of educational

and outreach efforts need support at the state level so that the public can be confident that their investment in GSHP will be successful.

3. **Support research and development on GSHP technology.** Despite being old technology improvements in efficiency and cost-effectiveness can always be made. The key to improving efficiency lies in improving the thermal conductivity of borehole materials by reducing their resistance to heat flow. Sometimes this is referred to as the temperature tax. As an example, in 2008, over 121,000 ground source heat pumps were sold in the U.S. with a total installed capacity of 416,000 tons of climate control[1]. Assuming 50% of these units were connected to the ground by vertical boreholes, over 36.4 million feet of borehole was required[2] at a cost in excess of $365 million dollars[3]. From an environmental perspective, the installation of these boreholes consumed 9.7 million gallons[4] of diesel and released 217 million pounds of carbon[s].

   Side by side tests of various ground exchange systems with different geometries and materials have already demonstrated it is possible to reduce borehole resistance by over 50% thereby improving overall ground exchange efficiency by over 40%. The implications of such improvements are significant. Based on the 50% utilization of 2008 unit sales across the nation, a 40% improvement in exchange efficiency will reduce drilling footage by 14.6 million feet, lower installation costs by $146 million dollars, reduce diesel fuel consumption by 3.9 million gallons and reduce carbon emission by 87 million pounds (or more than 40%).

   The added benefit of improving GSHP efficiency and installing more systems across the state is that we reduce the reliance on fossil fuel, reduce electricity demand and speed the path to energy independence.

   The Massachusetts Geological Survey is working with Thermonexus, LLC and the University of Massachusetts Amherst, Department of Geosciences to research ways to reduce borehole resistance. We submitted a Small Business Innovation Research (SBIR) grant to the U.S. EPA this year. We plan to use distributed temperature sensing with fiber optic cable to evaluate the temperature distribution in both the vertical direction and radial direction away from the center of the borehole. In this way, we can compare different casing and grout materials, different U-tubes design geometries to identify configurations that minimize borehole resistance cost effectively.

   Public support for research and development at the state level will certainly energize the research community to investigate improvements to GSHP installations.

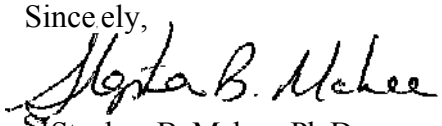
4. **Create more incentives at the state level to help lower initial costs and shorten the rate of return on investment.** The best way to tip the balance and promote the use of GSHP technology is to provide additional incentives on top of the 30% federal tax credit. Many states already do this. Connecticut offers a rebate of $550 per ton up to $1500. Public Service of New Hampshire offers incentives up to $7500 for the Home Energy Savings Program — geothermal track. Rhode Island offers a tax credit of 25% to a maximum of $7500. There are certainly other examples of incentives across the U.S. and Canada.

Implementing these four steps will: 1) propel the GSHP industry and allow Massachusetts to reach its GHG emissions target at a much faster rate; 2) spur research and development opportunities; and, 3) stimulate growth and job creation in the green economy. It will also create an environment where the public will be more

educated and confident about GSHP and will create a climate that promotes technical competency within the GSHP contracting community.

I appreciate the opportunity to submit this testimony. I will be glad to answer any questions you may have about this issue.

Since ely,



ST Stephen B. Mabee, Ph.D.,
State Geologist

[1] Eia.doe.gov – Renewables and Alternative Fuels – Independent Statistics and Analysis – Geothermal Heat Pumps
[2] Assumed required loop length of 175 feet per ton
[3] Based upon minimum average drilling and install cost of $10/foot
[4] Assumed fuel consumption of 20 gallons per hour and drilling rate of 75 feet per hour
[5] Eia.doe.gov – 22.38 pounds of carbon emitted per gallon of diesel

Gregor I. McGregor, Esq. and Sarah Herbert, McGregor and Associates, P.C.

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July 15, 2010

Attn: Lee Dillard Adams Bureau of
Waste Prevention
Massachusetts Department of Environmental Protection
1 Winter Street, 6th Floor Boston
MA 02108

Re: Draft Climate Implementation Plan

Dear Ms. Dillard Adams,

We support the framework proposed by the Climate Protection and Green Economy Advisory Committee to meet the 2020 and 2050 goals of the Global Warming Solutions Act ("Act") and submit these comments. We strongly encourage the adoption of the 2020 target to reduce GHG emissions by 25% below 1990 levels.

The maximum proposed reduction should be adopted as the 2020 goal in light of the Eastern Research Group Draft Report ("ERG Report") on cost-effective greenhouse gas mitigation which, in using the McKinsey & Company Cost Curve, estimated that the "Potential" case for GHG mitigation could result in a 35% decrease below 1990 levels. The goal should be ambitious and achieved (and ideally surpassed), for the next step will be 80% by 2050 and will require more than the "low hanging fruit" options being utilized to reach the 2020 goal.

Implementation to meet this target and the 2050 target of 80% reduction should be wholesale, using all methods available to the Commonwealth.

RECOMMENDATIONS

25% By 2020

The 25% reduction goal should be adopted as the ERG Report acknowledges that projections in the report may be understated. There is potential for cost-effective emission reductions to increase as new technologies develop and current technologies become more affordable. Further, not all cost-effective measures were taken into consideration in the report.

This conservative approach to the study is encouraging because even while erring on the side of caution and more easily quantifiable data, the potential reduction was still 35% below 1990 levels. This is 10% higher than the most ambitious reduction goal for 2020 proposed under the Act.

EMPLOY ALL METHODS AVAILABLE

The strength of the implementation plan is that it moves beyond command and control to reach reduction goals. We support the use of all methods available. The use of methods such as regulation, incentives, taxes and tax breaks will only increase the chances of this Act being a success.

Further, we suggest that intergovernmental coordination continue beyond the drafting stage and continue into implementation. An approach similar to that used in the Ocean Management Plan (with its interagency EEA Ocean Team) will provide oversight and coordination among the government agencies in the efforts to reduce GHG emissions. Interagency implementation is also more reflective of the notion that climate change needs to be addressed by all sectors - energy, building, transportation, agriculture, forestry, and so forth.

When the cost-effective measures are implemented there should be periodic monitoring of the success of such programs so that they may be adjusted in time to be effective in reaching both the 2020 and 2050 reduction goals, as well as any other interim goals that might be established.

1. Transportation

Because transportation is to account for more than one-third of the Commonwealth's total GHG emissions, reduction in the distance traveled by vehicles, increased public transportation, more efficient fuel standards and smart growth development are all important factors to achieving GHG reductions. Alternatives to single-occupancy vehicles should be endorsed. Incentives to reduce parking spaces required by offices in heavily congested areas, transportation subsidies and ride share support would not only reduce emissions from the transportation sector, but also improve commuter quality of life if done at a significant scale. Funding for public transportation will need to be seriously addressed in the coming years to achieve transportation efficiency beyond the cost-effective approaches for 2020.

Improving driver efficiency is important. In order to change driver behavior, information needs to be easily accessible to the general public. Efficient driving practices and proper maintenance practices should be accessible to the public through venues such as driver education courses, incorporated into

driving tests, and publicized at local RMV offices when registration for new permits or IDs is taking place.

2. Electricity Demand & Energy Supply

Increasing efficiency on the demand side through improvements in commercial, residential, and industrial buildings is a great first step in reducing the need for electricity as it appears that our decreasing dependency on conventional sources, at this point, will be achieved over a longer span of time.

It is important to remember that all communities need to be part of building efficiency. Energy efficiency programs focusing on larger, older residential complexes located in lower income communities would address building efficiency in addition to neighborhoods where home improvements are more financially feasible. Again, public education on home efficiency programs and their pay-off needs to be readily and clearly communicated to homeowners. One idea to consider is supplying incentives for those in the business of home repair and construction. Providing energy improvement-oriented home services at a discount (or in general) to their clients, such as window installation, could be incentivized with either discounted purchasing options or tax breaks if an established amount of energy efficient home repair and construction jobs are performed.

When addressing industrial processes, an action-forcing approach would be a successful way to change industrial process. Regulations should be promulgated setting timelines for industry for replacing ozone-depleting substances and SF6, or for phasing out HFC as a refrigerant.

We support further development in renewable sources of energy concomitant with improvements in energy demands and efficiency. Recent successes with Cape Wind and Hoosac Wind are burdened by a regulatory system unprepared to easily and efficiently permit such projects crucial to weaning our reliance on fossil fuels. We strongly urge that legislation such as the Wind Siting Bill be a high priority to further decrease our dependency on fossil fuels and increase our chances of success in meeting the 2050 target. Further R&D, incentives for solar and geothermal installations throughout the Commonwealth, and Smart Grid implementation all should be pursued to increase the chance of success in reaching our energy goals.

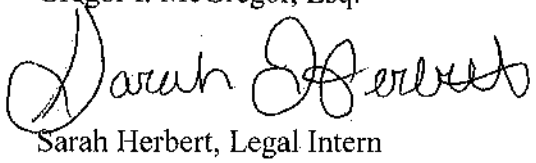
CONCLUSION

We support adoption of a 2020 goal to reduce GHG emissions by 25% below 1990 levels. By starting with a cost-effective approach, the Commonwealth can achieve this reduction through programs, regulations and incentives to promote behavior and development with GHG reduction in mind.

As the Commonwealth seeks to expand progress beyond the 2020 goal, the focus should be on offering diverse energy sources with lower or zero GHG emissions, mandate energy efficiency in development and construction, and further educate the public on ways in which they can decrease their contribution of GHG emissions.Thank you for considering our comments.

Very Truly Yours,

Gregor I. McGregor, Esq.



Sarah Herbert, Legal Intern

Lee Nason, University of Massachusetts Darmouth

UMass | Dartmouth

Facilities Planning, Design & Construction

June 24, 2010

Sir:

About one-third of all energy in the United States is consumed in the process of heating and cooling our homes and workplaces.

The only clean, renewable, and reliable source of energy that is currently feasible for home and workplace heating and cooling is geothermal. Geothermal is the only system that can make a dent in the enormous space heating and cooling loads and it is the only system that fails to get any official support from the Commonwealth of Massachusetts — in fact, the Commonwealth has instituted regulations that make geothermal installations essentially illegal in state buildings.

We are encouraged to use photovoltaic solar panels to generate electricity but since the sun is not always shining, they are unreliable and the toxic materials that are used in their construction makes them into a toxic time-bomb.

We are encouraged to use wind turbines to generate electricity but since the wind is not always blowing, they too are unreliable. Additionally, they are not at all cost-effective throughout most of the Commonwealth at the present time.

But if we attempt to install geothermal systems to utilize groundwater temperature differentials to provide space heating and cooling in Commonwealth Buildings, we are prohibited because LEED does not recognize the technology and because, rather than converting a source of energy into electricity and then using it conventionally, we are using that source of energy directly (and therefore more efficiently).

Geothermal is clean. There are no extraneous air or water emissions or greenhouse gas emissions.

Geothermal is reliable. Groundwater is always available at a consistent temperature.

Geothermal is efficient. It uses the earth's energy directly without incurring the losses involved in producing electricity or other fuels, distributing electricity or other fuels, and using the electricity or other fuels at each of our homes and workplaces.

Let's consider a recent real project in a Commonwealth Building. The existing building is about 40 years old and needs to be rehabbed. As a part of this rehab, the existing 40year-old heating, ventilating and air conditioning plant needs to be removed and replaced. I suggested that we install a geothermal plant and

everyone on the design team agreed that such a plant, while having somewhat higher installation costs, would have considerably lower operating costs and energy usage than any other alternative. But instead we will be installing a traditional fossil-fuel-powered (though admittedly reasonably energy-efficient) HVAC plant that will use more energy and cost more to operate each year because that is the only system allowed under Executive Order 484. It is ironic that EO 484 explicitly states that the goal is to reduce greenhouse gas emissions and reduce our reliance on fossil fuels while the specifics of the regulations force us to adopt technologies that produce greenhouse gas emissions and are entirely dependent on fossil fuels.

I know and understand that our politicians are not engineers but one would hope that they would seek the help of engineers in formulating regulations so that the regulations would actually accomplish the goals that they seek.

It is time for the Commonwealth to stop treating geothermal energy like an unwanted orph and encourage facility managers and other owners across the Commonwealth to cons" er one of our most promising technologies.

Lee Nason
Director — Facilities Planning, Design, and Construction University of Massachusetts Dartmouth

Angela M. O'Connor, New England Power Generation Association, Inc.

VIA ELECTRONIC MAIL: climate.strategies@state.ma.us

Ms. Lee Dillard Adams Climate Strategies Group

Department of Environmental Protection

Bureau of Waste Prevention One Winter Street, 6th Floor Boston, MA 02108

RE: NEPGA Comments on Proposed 2020 Emissions Reduction Target and Draft Climate Implementation Plan

Dear Ms. Dillard Adams,

Pursuant to the request for comments from the Massachusetts Department of Environmental Protection regarding the Massachusetts Global Warming Solutions Act ("GWSA") Draft Implementation Plan ("Plan"), the New England Power Generators Association, Inc. ("NEPGA") hereby respectfully files these comments.[1] NEPGA is the largest trade association representing competitive electric generating companies in New England. NEPGA's nineteen member companies represent over 27,000 megawatts (MW) of generating capacity in the region, and more than 12,000 MW's in Massachusetts alone. NEPGA's mission is to promote sound energy policies which will further economic development, jobs, and balanced environmental policy.

[1]The views expressed in these comments do not necessarily represent the positions of each of NEPGA's members. In addition, nothing in these comments should be deemed to waive any rights that NEPGA or any of its members may have to challenge the administrative, procedural or substantive validity of the implementation plan.

Proposed 2020 Emissions Reduction Target

As mandated within the GWSA, the Secretary of the Executive Office of Energy and Environmental Affairs ("EOEEA"), in consultation with other state agencies and the public, must set an emissions reduction target of 10-25% below 1990 levels by 2020 by January 1, 2011. Within the draft Plan, released April 30, 2010, Ian Bowles, EOEEA Secretary, expressed his intention to set an emissions reduction target between 18 and 25% below 1990 levels. According to the information within the Plan, modeling results indicate that Massachusetts is expected to achieve emissions reductions of approximately 19% below 1990 levels by 2020 through existing state policies which include RGGI and the Renewable Portfolio Standard. As such, NEPGA supports an emissions reduction target of 19% or below1990 levels for 2020. This realistic and attainable reduction level meets Secretary Bowles' targeted range (as well as the legislative mandate), while also removing the need for implementing additional regulatory policies which may unintentionally increase overall costs for consumers.

Worth noting is that generators of all fuel types throughout Massachusetts and New England have taken steps toward emissions reductions, independent of mandatory regulatory standards and targets since the restructuring of the New England energy market. Billions of dollars have been privately invested over the years for the construction of new, cleaner, renewable and more efficient facilities, as well as to provide environmental upgrades to existing facilities. As a result, capacity has increased substantially while greenhouse gas emissions, including NOx SO2 and $_{CO2,}$ have significantly declined. NEPGA is confident that Massachusetts can continue to incent such private investments which ultimately improve the environment; however, infrastructure enhancements are contingent upon a business climate that allows for sound and prudent investments through a consistent regulatory framework. NEPGA urges the EOEEA to consider the billions of dollars invested in clean, renewable and efficient technologies already taking place when setting the final 2020 emissions level.

Draft Implementation Plan

As part of the draft Plan, a consultant team analyzed each sector of the Massachusetts economy and identified areas and opportunities for emissions reductions. Of particular concern to NEPGA within the Plan is the suggestion that significant reductions of emissions in the energy supply sector may be achieved through both proposed and additional expansion of transmission lines to increase imports of Canadian wind and/or hydroelectric energy. NEPGA strongly opposes these suggestions. Unless safeguards are put in place, large Canadian imports will undoubtedly compromise New England markets, making it challenging for existing regional renewable resources to remain economically viable. In addition, as proposed, these measures will drastically reduce the value of renewable resources currently being developed and diminish the potential for the development of future renewable projects within the region.

The idea of achieving emissions reductions through the importing of electricity from Canada is also contrary to the goals set forth in the Massachusetts Green Jobs Act of 2008. The legislation specifically mandates that the Massachusetts Clean Energy Technology Center ("Center") only

approve investments that demonstrate "a defined benefit to the economy of the commonwealth." The clear intent of the legislation is to facilitate the funding of clean energy projects which will ultimately stimulate economic and job growth within Massachusetts. Again without appropriate safeguards, blindly accepting imported power in the manner suggested in the Plan significantly hinders the potential for long-term job opportunities from existing, new and developing regional generation resources, largely shifting those economic benefits to Canada in the process.

Furthermore, the EOEEA should consider that measures to increase Canadian imports may not always result in the intended consumption of low-carbon energy, a practice commonly referred to as "greenwashing." Greenwashing occurs when the generating source of energy being imported from a neighboring market into New England is not directly identifiable, leaving no guarantee that the import is actually from a non-emitting resource. To alleviate this concern, EOEEA should make sure that the non-emitting generating source is clearly identifiable.

NEPGA appreciates this opportunity to comment on the above-mentioned matters and requests that the EOEEA and additional state agencies consider its comments as submitted herein. Please contact me by email at aoconnor@nepga.org if I can provide any further information or clarification.

Sincerely,

Angela M. O'Connor
NEPGA President

Linda Olson Pehlke

To: Massachusetts Department of Environmental Protection
Bureau of Waste Prevention
One Winter St. 6th Floor
Boston, MA 02108

Attn: Lee Dillard Adams

From: Linda Olson Pehlke, Town of Brookline, Climate Action Committee
48 Browne St. #2
Brookline, MA 02446

Re: Draft Climate Implementation Plan

Date: June 14, 2010

1. 2020 Goal

The 2020 goal should be set at 25% or higher if possible. The consultant's study showed low to no-cost reductions of up to 35% possible by 2020. This leaves a 45% reduction still to be accomplished in the same amount of time (30 years) after the "low hanging fruit" has been harvested. We need to be as aggressive as possible early, this will save money and hardship in coming years.

2. ***Growing the clean energy economy***

Inspire innovation and collaboration through contests and grants to educational institutions in partnership with private business, i.e. mini X prizes to teams of high school or college students, funded by private enterprises who would then develop/market winning products or services.

Training and education for clean energy jobs, funded through State sponsored internships. Or develop model programs in partnership with community colleges and vocational/technical schools.

3. ***Time Horizons***

Assume future energy costs will incorporate more of the true costs (i.e. health and environmental externalities), therefore becoming exponentially more expensive. Add health and environmental benefits gained in the future to the payback for steps taken now.

4. ***Criteria***

1. Consider only those strategies that State policy can truly implement.

2. Give highest priority to strategies that enable and leverage other sectors of our economy and government to implement complementary strategies.

3. Minimize administrative burden to State. Devise ways to verify that are part of data collection already occurring, rather than creating new reporting mechanisms. Efficiency!

4. Implement strategies that will have long-range and multiplying benefits. For instance, land use planning reforms promoting smart growth will continue to have benefits and synergies in terms of health, access and reduced VMT and energy use for 100+ years.

5. ***Linkage with Adaptation Planning***

1. Any strategy that is necessary to avoid loss of life or irreplaceable property must be a priority.

2. That said, we should remain flexible in our attitude towards accepting possible change as the best adaptation, such as not replacing buildings in flood plains, etc.

Additional Comments Concerning Transportation Strategies

As an urban planner with land use and transportation planning experience, I feel this portion of the Climate Implementation Plan is weak. There are no significant reductions forecast for the transportation sector, nor are there any policy recommendations that will have a substantive impact. This is an important area, with great potential for GHG reductions.

1) DEP should include GHG emissions in its SIP compliance review.

2) DEP should set a VMT reduction goal and develop a comprehensive plan to achieve it. Higher gas mileage vehicles often encourage more driving, thereby negating their emission reduction potential

2) The size of projects subject to GHG emission review and mitigation should be lowered.

3) Simply saying the Commonwealth should *Promote Smart Growth* is overly simplistic and will likely not be successful. When it comes to combining dense development and alternative transportation options, the devil is in the details, these include ease of use, pricing, comfort, urban design elements, reducing parking or pricing it appropriately, etc. So often a project is called a TOD that is no more that a transit proximate development that does not promote transit use or link will with the fabric of the surrounding community. More guidance and expertise must be used to achieve better results.

4) Increase funding for pedestrian, transit and bike improvements.

5) Implement the gas tax and make it a % of the cost, so when prices rise the tax revenue increases.

Additional Comments Concerning Building Energy Retrofits

A State policy initiative is needed to directly deal with the problem of large condominium and multi-family buildings. Today, they are considered commercial buildings, yet are owned by multiple individual residential property owners. Incentives, rebates, etc. for renewable energy projects, energy efficiency improvements are not directly available.

Direct mandate to the Oil Heat industry to provide energy efficiency rebates in the same way that the gas and electric industry does. The opening “hook” can be through GHG inventory reporting requirements. An accounting of sales and usage will give a basis for calculating a proportional efficiency program “give back” equivalent to gas and electric companies. At a minimum audits should be subsidized through MassSave for Oil Heat customers. If not by the Oil Heat industry, then through the State.

Carl D. Orio, Water Energy Distributors, Inc.

Written Testimony
Draft Climate Implementation Plan (Plan)
Goals of the Global Warming Solutions Act
June 09, 2010

PUBLIC HEARINGS ON DRAFT REGULATIONS
Chapter 21 N and 298 of the GWSA

My name is Carl D., Orio. I am Chairman of Water Energy Distributors Inc (WED), a Nationally Certified GeoExchange Designer (CGD) and an Accredited Geothermal Installer (Al). WED is located in Hampstead NH (approximately 6 miles north of Haverhill MA). We are geothermal heat pump distributors and designers throughout New England and nearby New York. Our geothermal heat pump involvement traces back to 1974, manufacturing in Andover MA, and over 14,000 nationwide geothermal heat pumps and designs.

IMPACT ON MASSACHUSETTS JOBS

WED has distributed geothermal heat pumps technical information to approximately 265 heating, ventilation and air conditioning (HVAC) organizations in Massachusetts.

We have carefully reviewed the proposed Plan. We have received written and verbal comments from 16 installing contractors, designers and engineers support in this request that geothermal heat pumps be included in the subject Plan on an equal basis with solar and wind.

GEOTHERMAL HVAC RECOGNITION AS AN ENERGY SAVING RESOURCE

The Federal Internal Revenue Code section 48(a) recognizes geothermal heat pumps on an equal par with solar and wind. We respectfully request Massachusetts to recognize the nationally recognized the sustainable conservation and renewable value of this significant energy saving technology.

GEOTHERMAL PRACTICAL ENERGY CONSERVATION

Approximately 50% of all solar energy is absorbed into the earth. The geothermal heat pump provides a practical technology to harvest that renewable energy.

The largest energy use in the typical Massachusetts home provides heating, hot water and air conditioning. A properly designed and installed geothermal heat pump can reduce this largest domestic energy by 50% to 70% - every year for the life of the building. Geothermal heat pumps provide the

largest single source of energy savings in the typical home. Field monitoring of 110 homes have demonstrated a mean of 4.3 kW/ per square foot per year for heating , cooling and domestic hot water.[1,2]

PRACTICAL COMPANION TO SOLAR & WIND

A geothermal heat pump can harvest that solar energy with 400% - 500% efficiency. Every one single unit of solar photovoltaic or thermal or wind power can drive a geothermal heat pump to harvest three (3) to four (4) units of stored solar energy in the earth.

ENVIRONMENTAL BENEFIT ACCRUED BY GEOTHERMAL

Properly sized for a home or commercial building the geothermal heat pump provides 100% of all heating and cooling requirements. The GT heat pump inhibits the burning of fossil fuels at residential, industrial and commercial facilities. Space conditioning with geothermal achieves reduction of oil burning emissions by 21 pounds of carbon dioxide for each gallon of fuel oil and 10 pounds of carbon dioxide emissions reduction for each gas therm (—CCF).

An *additional* 11.6 pounds of carbon dioxide, per units of measure, is emitted to deliver the fossil fuel to the combustion site (see federal Energy Information Agency data sheets). Burning emissions combined with this transportation factor, geothermal heat pumps inhibit emissions of

32 pounds of CO2 per gallon of oil
21 pounds of CO2 per CCF of gas

As above, energy to drive the geothermal heat pump can be derived from solar or wind power.

COMMUNITY HEALTH BENEFITS REALIZED BY GEOTHERMAL

The Federal Energy Information Administration (EIA), The Conservation Law Foundation, US EPA[3] and other concerned organizations have recognized and quantified community health and economic benefits by gas emission reductions

GOETHERMAL HEAT PUMPS IN MASSACHUSETTS

With the recent on-rush of geothermal heat pump projects there have been problem installations. The pariah often is usually more news-worthy than the successful system.

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[1] PSNH "Heat Smart" metering results 2006-2007
[2] International Standards Organization Standard ISO-13256
[3] "Space Conditioning the Next Frontier" EPA Report 430_R-93-004

Some properly designed and installed large facilities in Massachusetts:

	MA City	Installed	Size[4]
Park View Apartments	— Winchester	- 1970	450 tons
Public Library	- Haverhill	- 1995	120 tons
Hasting School	- Westborough	- 1996	200 tons
Trinity Church	- Boston	- 2006	130 tons
Middle School	- Great Barrington	- 2006	200 tons
Visitor Center	Adams	- 2004	35 tons
Public Library	- North Adams	- 2005	90 tons
Harvard, 5 buildings	- Cambridge	- 2005-09	320 tons+

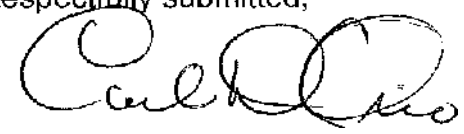
MASSACHUSETTS INTEREST

From Massachusetts alone, since January of this year to July 8th, we are pleased to note that our web site www.northeastgeo.com has received 17,450 hits; Massachusetts demonstrates a deep awareness and interest in geothermal. We estimate there are approximately 4,500 geothermal installations with which we have distributed and or designed since 1974. Geothermal is a key part of Massachusetts "Green Image".

GEOTHERMAL is a practical implementation of the Commonwealth's "Green Goals"

Thank you for the opportunity to provide this testimony and we would be pleased to answer any questions or provide more detailed discussions or comments as you may require.

Respectfully submitted,



Carl D. Orio, Chairman, C D;Al
Water Energy Distributors Inc.
2 Starwood Drive Hampstead NH
03841
o. 603-329-9122
f. 603-320-0285
c. 602-234-8393

[4] Dates and dominant loads in tons (12,000 btu/hr) are approximate

Barbara Pelissier, Friends of the Upper Roberts Meadow Reservoir and Dam

From:	Barbara Pelissier
To:	"Strategies, Climate (DEP)" <Climate.Strategies@state.ma.us>
Date:	7/15/2010 8:11 AM
Subject:	In Support of adding hydroelectric as a clean energy source in Climate Implementation Plan

Mr. Lee Dillard Adams,

I am writing in support of an addition to the addition of low impact hydroelectric in the draft of the Climate Implementation Plan.

As a member of the Friends of the Upper Roberts Meadow Reservoir and Dam, located in Northampton, MA, I know first-hand that the move to low impact hydroelectric power at our many dams is sorely lacking in leadership and education. Local DPWs and local water departments simply do not have the backing of the state or the visible leadership necessary to move them off the dime. Co-Act's smart development approach provides a way to access this clean energy source to benefit our communities in a myriad of ways, from reduction in the use of fossil fuels to the preservation of often historic dams and beautiful reservoirs/open space/wildlife habitat, depending on the location of the particular dam.

I was moved to join the Friends because of the beauty of the Upper Roberts Meadow dam and reservoir. Once I researched its history, and the history of the site, I was determined that this dam should be repaired, not removed. Then I learned about the hydroelectric power potential and now find that it is my main focus, as it incorporates all that I hold important, while still preserving a beautiful and historic dam and reservoir habitat.

I support Co-Act in their efforts to revitalize existing dams and develop clean, affordable energy and revenue for western Massachusetts. Time is running out. Look at what's happening in the Gulf. We can side-step these disasters and make use of the clean, renewable energy that's already at our doorstep.

While I believe it would be irresponsible for local officials to turn their backs on this revenue-generating resource, I can understand that they have had little guidance in the realm of moving to hydroelectric power vs. tearing down dams. They know how to fill out the paperwork to tear them down. Co-Act is currently leading the way in assessments and proposals for smart development dams and Essex Partnership is assisting. They are onto something big by linking dams in Berkshire County and I want to see that happening in Hampshire County and the Pioneer Valley, as well.

Please include hydroelectric potential in the Massachusetts Climate Implementation Plan Draft.

Sincerely,

Barbara Pelissier, President, Westhampton Historical Society & Member, Friends of the Upper Roberts Meadow Reservoir & Dam (Northampton, MA)
96 Stage Road
Westhampton, MA 01027

Leslye D. Penticoff, Students for a Just and Stable Future

From:	"Leslye D. Penticoff"
To:	"Strategies, Climate (DEP)" <Climate.Strategies@state.ma.us>
Date:	7/15/2010 4:07 PM
Subject:	Comments for GWSA implentation plan

I would like to submit the following comments for consideration: I am a student at Wellesley College, and I have lived in Massachusetts for over three years now. I have taken action for long-term environmental sustainability and against the threat of climate change for even longer because I am worried that the world will soon be a dangerous place for me

and my generation. Since moving here, I have been inspired by the commitment that the Massachusetts government has demonstrated to safeguarding my future by adopting groundbreaking legislation like the Global Warming Solutions Act and resolutions like calling for the federal government to repower America with 100% clean electricity in 10 years. You have been leaders, and now you have the opportunity to lead again by committing the state to a major shift to a green energy economy. But what was leadership in 2008—namely, the 25% capped reduction goal by 2020—is no longer leadership. Scientists around the world like NASA's Dr. James Hansen support me in saying that we now must reduce the concentration of CO2 in our atmosphere to 350 parts per million (ppm) to ward against the worst impacts of global warming, not the 450-plus ppm goal that we based our 2020 and 2050 goals upon. We are now at 392 ppm. Leadership now means carbon neutrality as quickly as possible. I am asking you for 100% clean electricity sources in Massachusetts by 2025.

After reading the ERG consultant's report, I can confirm that Massachusetts has no excuse for limiting itself to 25% reductions in carbon emissions below 1990 levels by 2020. In fact, it has no excuse for limiting itself to 35% reductions by 2020 by adopting only the easiest, most convenient solutions. If you consider that one major wind farm in federal waters off the Massachusetts coast could power the whole state, and that we expend $252 million every year to purchase enough coal from out-of-state ($206 million of which goes to Colombia) to power less than one-third of the state, it suddenly looks very logical to make dramatic changes to our electricity sector. Converting the coal-fired units of the Brayton Point Power Station to renewable energy generators would prevent as much carbon emissions as taking 1.3 million cars off the road. So, I also ask that in your implementation plan you commit to phasing out coal by 2020 and direct the money that you save to installing existing renewable energy technology across the state. This is a simple first step towards carbon neutrality that cannot wait any longer.

Part of the reason that attending college in Massachusetts attracted me was that this state is a hotbed of innovation, a convergence of inspirational leaders, top scholars and public servants committed to pushing the envelope to make our society a better place to live. I will graduate in one year, and I will be deciding whether to stay in Massachusetts or whether my energies would be better spent elsewhere. I dream about living and working somewhere that takes my future on this planet seriously, and I am not alone. I can tell

you this: if Massachusetts continues to inspire me with its leadership on climate solutions and offer opportunities for cutting-edge innovation, I will devote myself to staying here and working with you. If not, I will leave for a state or a country that does.

I also speak on behalf of a generation of student organizers across Massachusetts that recognizes the urgency of taking a stand against climate change. You have the chance to make history, and we want to help you lead the world into a clean energy future. My fellow students and I are a renewable resource that you cannot afford to waste.

Sincerely,

Leslye Penticoff
Metro West Regional Coordinator, Students for a Just and Stable Future
19 Acadia Park
Somerville, MA 02143

Smitty Pignatelli, State Representative

HOUSE OF REPRESENTATIVES
STATE HOUSE, BOSTON 02133-1054

July 13, 2010

Department of Environmental Protection, Bureau of Waste
Prevention Attn: Lee Dillard Adams
One Winter Street 6th Floor
Boston, MA 02108

Re: Letter of support to include local, low impact hydroelectric in the "Draft Climate Implementation Plan"

I am writing in support of an important addition to the Massachusetts Climate Implementation Plan. There are many existing dams in Western MA that are capable of providing clean energy and a steady cash flow to the municipalities where they are located. By using these existing structures we can take a huge step forward in our goal of reducing carbon emissions and protecting our environment. I strongly support the "smart development" approach proposed by the Co-Act as it provides a way to access this valuable clean energy source to benefit our communities.

Thank you very much for your consideration and please do not hesitate to contact me.

Sincerely,

SMITTY PIGNATELLI
State Representative

David Proctor and James Bryan McCaffrey, Sierra Club

July 15, 2010

Ms. Lee Dillard Adams
MassDEP
1 Winter Street
Boston, MA 02108
email to: climate.strategies@state.ma.us

RE: Comments on Draft Implementation Plan for the Massachusetts Global Warming Solutions Act

Dear Ms. Dillard Adams:

On behalf of the Sierra Club, we submit the following comments on the draft implementation plan for the Global Warming Solutions Act (GWSA). We commend the administration for the tremendous strides already made with both legislative and regulatory initiatives to control greenhouse gas emissions. The Regional Greenhouse Gas Initiative (RGGI), the Green Communities Act, the Oceans Managements Act, the Wind Siting Bill, approval of the nation's first offshore wind farm, and the regulatory directive on biomass energy are but a few of the actions that will help keep Massachusetts at the forefront of innovative Greenhouse Gas (GHG) reduction strategies.

We further recognize that much of this progress has occurred under severe budget constraints, including significant cuts in staffing within the Executive Office of Energy and Environmental Affairs (EOEEA). Strategies developed to address GHG reductions in the commonwealth will require a rigorous and meaningful financial investment from the legislature as well public and private commitments, where they can be identified, to provide the necessary resources to achieve the goals of the GWSA. Despite these fiscal challenges, we feel that EOEEA has been performing very high quality work in several complex environmental-policy areas. EOEEA has been exemplary in basing its decisions on the latest and best available science, and acted quickly to call for new scientific investigation where current information was inadequate. This continued approach will be needed nowhere more urgently than in the implementation of the GWSA.

Most scientists now favor James Hansen's 2050 goal for carbon dioxide in the atmosphere of 350 ppm, not the previous goal of 450 ppm. Since we are currently at 390 ppm of CO2, this would require an even more aggressive CO2 reduction plan than 25% below 1990 baseline levels by 2020. Many actions are low cost actions (e.g. importing hydropower from Canada) with insufficient emphasis on other programs such as moving to Zero Waste policies. We note that nothing in the act prohibits the state from imposing more stringent limits.

Finally, we must recognize that a patchwork of individual legislative mandates/bureaucratic regulations (msw, wastewater, transportation, energy, etc.) will likely be insufficient and could even hinder the integrated action that will be required to reduce GHG emissions. The Northeast/Mid-Atlantic States Low Carbon Fuel Standard Program is one example of progress by the administration on this front, but much more will be need to be done to identify and eliminate or bypass bureaucratic barriers in our efforts to address the global climate crisis.

Our detailed comments follow this cover page, and are divided into two sections. Section 1 contains responses to the specific questions on which EOEEA sought comments. Section 2 provides a more expanded set of recommendations on how best to develop a plan to implement the act. We look forward to working with you to help achieve these goals.

Sincerely,

Dan Proctor, Chair

James Bryan McCaffrey, Chapter Director

Section I. Specific questions on which EOEEA requested public comment:

Q1. *Where between 18 and 25 percent below 1990 levels should the emissions limit for 2020 be set and why?*

A. Obtain maximum feasible emissions reduction as quickly as possible, aiming well above a 25% reduction. Grounds for this position:

1. The most recent and authoritative science indicates that Massachusetts needs to reduce GHG emissions faster and more deeply than called for by the Global Warming Solutions Act.

2. The Act does not prohibit exceeding 25% reduction by 2020:SECTION 8. "...nor shall this act prevent the imposition of more stringent limits on emissions."

3. The most recent scientific findings suggest that in order to maintain a stable climate, with ice on both poles and mountain glaciers that continue to provide water to billions of people, atmospheric levels of CO2 must stabilize below 350 parts per million (ppm).[ii] The IPCC analysis and the Global Warming Solutions Act were both based on earlier belief that a concentration of 450 ppm was acceptable. This level already stands above 390 ppm and is increasing. Massachusetts, the United States, and the world must quickly stop putting carbon into the atmosphere, and start drawing it down.

4. EEOEA's consultants estimate that a 35% reduction is possible "at low or zero cost, or at a net savings." And that is using the consultants' conventional (i.e. too narrow in these circumstances) definition of "cost-effective." Furthermore, "[t]he projections in this report may understate the true potential for cost-effective emissions reductions in 2020."

5. Produce as much savings as possible as early as possible for later investment in measures not seen as conventionally "cost-effective."

6. The Act does not define "cost-effective." This phrase must be understood in terms of preventing the climate system from tipping into a condition controlled by runaway feedback loops--that is, a condition in which no conceivable human measures could prevent global catastrophe.

Some examples of the feedback loops that are already under way:

a. Increasing Forest Fires (including "megafires") due to:
--decreasing rainfall in many areas

--generally increasing temperatures

--increasing winds along with drought, making fires harder to control --increasing vulnerability of trees to attack by lethal organisms

b. Decreasing ocean CO2-absorption capacity

c. Melting permafrost, releasing huge quantities of methane and other GHG's

d. Albedo Effect: Increased melting of snow and ice means decreasing reflectivity of sunshine, causing more heat absorption, which means warmer water, which means faster me lting.

e. Increasing use of air conditioners with increasing temperatures

Q2. *What role can Massachusetts state government play in catalyzing the clean energy economy? What policies could inspire entrepreneurship and create markets for clean energy products and services?*

A. Lead by example: Quickly minimize GHG emissions from government-owned buildings and equipment: Pass a comprehensive energy revenue bond bill to retrofit buildings, including schools and colleges. The bond could be retired with savings generated by the retrofits.

Encourage or require locally-generated clean energy. Importation of clean energy from outside state or national borders seems a questionable policy to promote a clean energy economy within the state, though it may be a n excellent way to reduce GHG emissions if it does not entail "leakage" (as defined by the Act).

Q3. Over what number of years should cost effectiveness of strategies be evaluated in pursuit of the goals of the Commonwealth for 2020 and 2050? How should future costs be compared to present costs?

A. The Act does not define "cost-effectiveness," though it employs the term. Deciding on an appropriate cost-effectiveness test, discount rate and time-frame in this circumstance is critical, and each must be decided with respect to the others. Furthermore, there is a wild card in this circumstance that is absent from conventional considerations of cost-effectiveness: the cost of failure. The Sierra Club's position is that this cost, while unknowable with any accuracy, is so high as to make just about any cost an effective one. From this viewpoint, deciding on particular measures is a matter of ranking them from most to least cost-effective, beginning with the most and moving as rapidly as possible to the end of the list.

Q4. How should the Commonwealth evaluate and prioritize strategies to achieve 2020 and 2050 goals?

A. Use an adequate system dynamics model (preferably C-ROADS adapted to Massachusetts—see *Section 2: Recommendation 1* below) with provision for key variables such as "public acceptance" "net savings" "net tax burden" along with "GHG emissions rate" and "accumulated GHG." This model should allow policy selection with the optimal combination of the key variables.

[ii] Target Atmospheric CO2: Where Should Humanity Aim? Hansen et al. http://www.columbia.edu/~jeh1/2008/TargetCO2_20080407.pdf

Section II. Further Recommendations

1. Use the best methodology for adequate analysis and policy selection: System Dynamics

> *"Section 4. (d) The secretary shall evaluate the total potential costs and economic and noneconomic benefits of various reduction measures to the economy, environment and public health,* ***using the best available economic models*** *[emphasis added], emissions estimation techniques and other scientific methods."*

An adequate plan must be based on adequate analysis. Ecological and economic systems both contain many interacting feedback loops. Another way of referring to such loops is vicious or virtuous cycles. An adequate analysis must identify and take into consideration such loops.

Our ecological and economic systems are intricately intertwined. The Act calls for action in both these systems over a 40-year time-span. Spreadsheet-based modeling for a matter of this import and complexity is unacceptable except for very narrow calculations separate from the primary model. Econometric modeling suffers from being based on correlation rather than causation. We believe that the most adequate methodology for dealing with feedback systems of this complexity over time-spans of this length is system dynamics. Coincidentally, this methodology was developed here in Massachusetts (at MIT) beginning over 50 years ago. While not familiar to the general public, it is widely used for analysis and policy selection in corporations and, increasingly, in governments around the world. There are numerous consulting firms in the state that use system dynamics extensively in their work.

Furthermore, a system dynamics model (C-ROADS -- Climate Rapid Overview and Decision-support Simulator) was used at last November's climate summit in Copenhagen to rapidly assess each nation's proposed climate policies. This model is now being employed in U.S. Senate climate-bill negotiations and is also being adapted for use by other nations, notably China. An instructional version of the model may be reviewed on-line at http://forio.com/simulation/climate-development.

We recommend that EOEEA adapt the C-ROADS model for use in developing a plan for implementing the Act. If Massachusetts is the first state to adapt the model, it could presumably recoup associated costs by licensing its model to other states.

2. Learn from other states and nations

The Draft Plan takes no notice of emissions-reduction plans already in place in other states or countries, despite the Act's requirement that "The secretary shall consider all relevant information pertaining to greenhouse gas emissions reduction goals and programs in other states and nations."

Each European Union member country must submit to EU headquarters an energy plan in its native language. The plan is then translated into English and posted at http://ec.europa.eu/energy/index_en.htm.

We recommend this site to EOEEA's attention not only as a source of relevant information but also as an example for emulation with respect to EOEEA and the commonwealth's 351 municipalities (please see continued discussion below with respect to RPC's).

The Sierra Club has examined Denmark's most recent plan, which focuses on renewable energy. In this regard, EOEEA's draft plan seems narrowly focused (aside from importing renewable energy) on

increasing the efficiency of fossil-fuel use. The latter approach may yield a considerable drop in emissions in the short run, but at the same time tends to lock us into continued fossil fuel use over the longer run. This is especially the case with replacing older heating oil furnaces with more efficient models during the next 10 years: this presumes the continued burning of heating oil for the succeeding 20 years, i.e. the life of the new equipment. Section 3.(b) of the Act seems to be aware of this danger:

> *"the 2030 interim emissions limits shall maximize the ability of the commonwealth to meet the 2050 emissions limit;... the 2040 interim emissions limit shall maximize the ability of the commonwealth to meet the 2050 emissions limit."*

The Danish plan requires switching, where feasible, to renewable energy sources when heating-oil equipment is replaced. In Massachusetts, heating oil systems should be replaced where feasible by a) renewables, including geothermal or b) high-efficiency natural gas systems. This should produce at least a 40% reduction in CO2 emissions and probably an increasing financial savings over time if heating oil prices continue to increase, as they are likely to do.

3. "Recycle" some savings into further investment

The Draft Plan appears to allow all savings from contemplated measures to accrue to the consumer, with none being captured by government for either investment in further emissions reduction or pursuit of equity among segments of the populace or economy. Such capture and "recycling" should be given extensive consideration.

4. "Mine" energy efficiency and zero waste policies as new revenue streams for state and local government.

Demonstrate to municipalities how optimal energy and waste policies can produce significant new revenue. This should include zero waste policies, which conserve resources while reducing emissions and disposal expenses.

5. Zero Waste - Include waste reduction as a major strategy for reducing GHGs

Waste reduction is largely neglected in the plan. The one-sentence mention refers only to diversion with no attention to reduction. Since solid-waste incinerators produce more C02 than coal-fired plants, we recommend that much more attention be given to this matter. See epa.gov/cleanenergy/energy-and- you/affect/air-emissions.html.

Organic waste

EPA GHG emission inventories estimate landfill methane emissions at about 2% of total anthropogenic (i.e. manmade) GHG emissions in the U.S in 2005. It appears that, depending upon which assumptions are adopted (i.e. high vs. low gas collection efficiency, long vs. short term time periods for measuring impacts (GWP), and wet cell vs. dry tomb management), landfills may be responsible for a much greater impact -- up to approximately 12% of total GHG emissions. Using the latest IPCC 20-year GWP of 72 to weight methane instead of the earlier IPCC 100-year value

of 21 used by EPA will, by itself, increase the estimated percentage of GHG emissions by more than three times.

In addition, any assumed CO2 benefit from utilizing methane captured at LFGTE facilities is greatly outweighed by an increase in fugitive (uncontrolled) methane emissions resulting from the altered landfill management methods apparently practiced at most LFGTE projects.

To reduce emissi ons from landfills, organic materials should be banned from disposal and diverted to composting or anaerobic digestion.

Products and packaging

On September 18, 2009, EPA released a report detailing why the production, transportation, and disposal of goods and materials can be seen as the largest opportunity to reduce GHG emissions. Production emissions contribute the greatest share, indicating that "upstream" reductions in waste generation are an appropriate focus. The lead author, Joshuah Stolaroff, in a white paper released the same day, explains why enhanced producer responsibility (EPR) measures are among the most important steps that state and local governments can take to reduce GHG emissions. Also, Lisa Skumatz has done extensive work comparing energy-efficiency meaures to waste-reduction measures and finds that waste reduction is cheaper and produces much faster results. She recommends that waste reduction, especially PAYT be on the "first tier" of GHG reduction measures.

6. Maximize the important role that can be played by regional planning commissions (RPC's) in both implementing a plan and educating municipal officials and the public.

The reasons we emphasize the role of the RPC's are:

a) Much of the legislation passed by state and federal governments regarding emissions-reduction relies on municipalities, individual households and individual businesses for actual implementation.

b) It is highly inefficient to expect or require 351 separate municipalities to separately invent 351 wheels. That is, to round up an energy committee, learn how to develop an energy plan, prepare the plan, get the plan accepted by city council or town meeting, then try to persuade businesses and residents to carry out the plan. But to the extent that this will be the modus operandi, RPC's can play an important catalyst, educational, and burden-assuming role in the process.

c) State government already provides a template document for long -range municipal planning. In practice, this planning is mostly done by professional staff (and sometimes subcontractors) at the local and regional planning levels. Energy planning will soon expand into broader sustainability plans (this is already happening in some communities), and then merge with existing long-range planning processes. State government and the RPC's already have established templates and other procedures regarding long-range planning. These should be expanded to include energy/sustainability planning.

d) EOEEA should maintain a website to support municipal energy/sustainability planning. It would be readily accessible to municipal officials, businesses and citizens; and would contain among other information current plans submitted by municipalities.

e) If the C-ROADS model is adapted to Massachusetts, it could be further adapted for municipal use. This modeling methodology can be readily applied to broader sustainability planning. Here, too, the RPC's can play a key role in educating municipal leadership on the value and use of this kind of modeling.

Thank you for the opportunity to comment, and for your attention to this issue of great importance to our organization. Please contact us if you have any questions regarding the Sierra Club's views on these matters.

David Rabkin, Cambridge Climate Protection Action Committee

July 23, 2010

Department of Environmental Protection
Bureau of Waste Prevention
One Winter Street, 6th Floor
Boston, MA 02108
Attn: Lee Dillard Adams

Re: Comments on Draft Climate Implementation Plan Dear

Ms. Adams:

The Cambridge Climate Protection Action Committee (CPAC), a municipal advisory group, submits the following comments on the MA Draft Climate Implementation Plan. CPAC recommends that the Commonwealth take the following steps:

1. Set the greenhouse gas (GHG) reduction goal at 25 percent below 1990 levels by 2020, the maximum allowed under the Global Warming Solutions Act. If the state's analysis is correct, existing policies would yield a 19 percent reduction in GHG emissions and the preliminary suite of cost-effective future actions would take Massachusetts well beyond a 25 percent reduction.

2. Articulate a "reach goal" or "feasible goal" that goes beyond the 25 percent threshold given the preliminary analysis presented by the state. Achieving reductions earlier will make the likelihood of reducing GHG emissions by 80 percent by 2050 more likely.

3. Include a role for local communities in achieving the Commonwealth's greenhouse gas emission reduction goal. Making improvements to individual buildings and changing individual behavior in terms of energy use can be greatly facilitated by community-based campaigns that use social marketing strategies and techniques. In addition to leading by example strategies, which Massachusetts is supporting with the Green Communities program, municipalities can urge and support their residents, businesses, and institutions to become more energy efficient, use more renewable energy, become less car dependent, and generate less waste. We believe that community-based efforts will be necessary to achieve high participation rates in the various programs, including the utility energy efficiency plans, and follow through on implementation. Currently there are about 35 communities in Massachusetts that participate in ICLEI-Local Governments for Sustainability.

<u>Detailed Comments on GHG Reduction Strategies and Opportunities</u>

It is difficult to comment in a comprehensive manner about the state's analysis of future emission trends and reduction strategies without reviewing all the underlying reports and references that have been used. We offer the following observations and comments, some of which may reinforce the state's assessment or add some additional detail for consideration.

- Cambridge has recently seen progress in reducing dependence on automobiles and shifting people toward other modes of transportation. This progress is the result of many years of effort on policy (e.g., Parking & Transportation Demand Management Ordinance), infrastructure (e.g., street redesign and reconstruction), and social marketing. Most likely, it's the synergy between all the initiatives that is working. Based on annual surveys, bicycling more than doubled from 2002 to 2008 in Cambridge and automobile work commutes by residents and employees declined by 4-5% since 2000.

- The state assumes that vehicle miles traveled will decline in part on the basis that 200,000 new housing units will be constructed in smart growth neighborhoods. Unless these new units replace existing housing units that are in more car dependent areas and residents resettle in the smart growth neighborhoods, these new units would add vehicle miles traveled. The final plan should clarify this dynamic and how in fact it will lead to a reduction in VMT and emissions.

- DOER recently suspended the biofuel content requirement for heating and transportation fuels. We assume the emissions projections need to be adjusted to reflect that this requirement may not be in place.

- According to census data, between 1990 and 2005, the number of cars registered rose by 30% in Metro Boston, and by 38% in Massachusetts. The Boston Metropolitan Planning Organization (MPO)'s 2009 Transportation Plan Network Model (including 164 communities in the eastern Massachusetts model area) indicates that vehicle miles traveled (VMT's) on an average weekday will increase from about 108 million (2000 base year) to about 126 million (2030), a 16% increase. The model indicates no real change in VMT per capita (about 25 VMT per capita per day) between 2000 and 2030. The model projects the transit mode share to increase from 6.3% (2000 base year) to 8.1% (2030), and a total increase in transit demand (caused by projected population increase) is projected to increase by 50% from about 900,000 daily trips (2000 base year) to about 1.3 million trips (2030). Note that none of these statistics are projected to change whether the RTP is implemented (the "build" scenario) or not implemented (the "no-build" scenario). Given the projected 16% increase in total VMT, we believe it will be very challenging for the Commonwealth to meet its GHG emission reduction goals unless revenue is directed towards policies and projects that support sustainable modes of transportation rather than highway expansion projects.

- The ERG analysis cites "smart driving" as a potential source of emissions reductions. The ERG memo notes the success of Staples in improving fleet fuel efficiency. If the state expects "smart driving" to yield significant reductions from non-fleet drivers, that seems very optimistic. Such a strategy would likely need to be based on mandatory, enforceable requirements such as strict enforcement of highway speed limits.

- In regard to the importation of hydropower as a GHG reduction strategy, we wonder if emissions from reservoirs have been considered as an issue? The Committee is certainly not an expert on this matter, but we note that much has been published about GHG emissions from freshwater reservoirs. We believe the emissions are related to the decomposition of organic materials that are flooded when a dam is constructed. If the state is going to consider imported hydropower as a basic emissions reduction strategy, it may be prudent to assess the issue of emissions from reservoirs. It strikes us that this issue may parallel that of the carbon debt associated with biofuels and biomass. The Committee is not opposed to the proposed strategy if the net emissions associated with imported hydropower are beneficial.

We appreciate this opportunity to comment and look forward to the final plan later this year.

Sincerely,

David Rabkin, Chair

Susan Reid and Melissa Hoffer, Conservation Law Foundation

CONSERVATION LAW FOUNDATION

July 15, 2010

Via electronic mail

Lee Dillard Adams
Massachusetts Department of Environmental Protection
Bureau of Waste Prevention One Winter Street, 6th Floor Boston, MA 02108

Re: Comments on Draft Climate Implementation Plan

Dear Ms. Adams:

The Conservation Law Foundation (CLF) appreciates the opportunity to comment on the Commonwealth's Draft Climate Implementation Plan (CIP) pursuant to the Massachusetts Global Warming Solutions Act (GWSA). We commend the Commonwealth for its leadership on climate change and energy policy, which places Massachusetts at the forefront of states tackling this challenge proactively and identifying opportunities to transform the challenge into economic and social benefit for Massachusetts residents. We are grateful for the thoughtful approach reflected in the plan and look forward to working with the Executive Office of Energy and Environmental Affairs (EOEEA) and other agencies to develop a strong plan that ensures Massachusetts will achieve the GWSA's mandatory greenhouse gas (GHG) reduction targets.

As you know, the GWSA requires that the Secretary, no later than January 1, 2011, develop a "2020 statewide emissions limit and a plan to achieve that limit pursuant to Section 4 [of the Act]." The following comments focus on key issues addressed in the Draft CIP, specifically the 2020 emissions reduction mandate and measures that should be included as part of the implementation plan for achieving that 2020 mandate while setting the stage for the deeper emissions reductions needed over the coming decades.

As reflected by Eastern Research Group's (ERG) Reports, Massachusetts is positioned extremely well for both (i) meeting the short-term greenhouse gas emission reduction requirements of the GWSA and (ii) setting a firm trajectory for reducing emissions to at least 80% below 1990 levels by 2050.

CONSERVATION LAW FOUNDATION

I. The 2020 GHG reduction mandate should be set at 25 % below 1990 levels.

The Draft CIP expressly seeks guidance regarding the greenhouse gas emission reduction target that should be set for 2020, in accordance with the GWSA's requirement that greenhouse gas emissions be reduced 10 to 25% below 1990 levels by 2020 and that the Secretary of Energy and Environmental Affairs set a specific mandate consistent with this range by January 1, 2011. In light of analysis by ERG et al. indicating that Massachusetts already is on track to reduce emissions more than 18% below 1990 levels by 2020, the Secretary appropriately announced in April 2010 that the consideration of emission reduction mandates would be focused on the range of 18-25% (below 1990 levels).

There are a number of compelling reasons for setting the 2020 GHG emission reduction target at 25% below 1990 levels, the maximum target contemplated by the GWSA. First, this would be consistent with scientific consensus regarding the minimum emissions reductions that should be required. Indeed, the Intergovernmental Panel on Climate Change (IPCC) recommends that industrialized nations should reduce GHG emissions at least 25% to 40% below 1990 levels by 2020 in order to avoid the worst impacts of climate change. Second, adopting a 25% emission reduction target for 2020 is expected to significantly ease the transition to the GWSA's mandatory 80% reduction in emissions (below 1990 levels) by 2050, since it would establish a gentler emissions reduction pathway rather than postponing action and necessitating steeper reductions in later years. Further, adopting the most ambitious 2020 emissions reduction target under the range set forth in the GWSA will propel the Commonwealth well ahead of the curve of inevitable federal regulation, and further establish Massachusetts as a source of clean energy solutions for the rest of the nation. Moreover, by setting a strong target now, Massachusetts will be better situated to maximize economic development opportunities and other economic benefits of transitioning to cleaner energy alternatives — for example, by redirecting billions of dollars currently spent on coal, oil and gas resources (none of which are produced in Massachusetts) toward investment instead in energy efficiency, conservation, and clean renewable energy. Further support for adopting a 25% GHG reduction target by 2020 can be found in ERG's analysis indicating that Massachusetts may be able to reduce GHG emissions by up to 35% below 1990 levels by 2020 through measures that are low-cost or are likely to produce cost savings.[1]

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[1] ERG's assessment of low or no-cost GHG reduction potential in Massachusetts by 2020 is consistent with the so-called "McKinsey Report's" oft-cited cost curve. "Reducing U.S. Greenhouse Gas Emissions: How Much at What Cost? U.S. Greenhouse Gas Abatement Mapping Initiative Executive Report," December 2007, Jon Creyts et al., McKinsey & Co at p. 20 (Exhibit 11). However, it is important to keep in mind that some groundwork should be laid now for the programs and policies that are targeted toward much steeper emissions reductions by 2050, irrespective of whether these long-term measures represent the lowest hanging fruit for short term emission reductions pursuant to the McKinsey and ERG analyses.

Recommended Policies and Programs to Achieve the GWSA's short term emission reduction mandate while setting the stage for long-term success:

CLF appreciates that the Draft CIP sets forth a high-level framework that begins to define a roadmap for achieving the GHG emission reductions the GWSA requires by 2020. CLF recommends that the following considerations, including specific policies and programs, be taken into account and incorporated into the Final CIP:

A. *Reducing Emissions Associated with Energy Supply and Buildings*

With policies in place such as the Massachusetts Renewable Energy Portfolio Standard (RPS) and the Regional Greenhouse Gas Initiative (RGGI), Massachusetts can build from a solid foundation in terms of reducing emissions from the electric sector. Yet Massachusetts needs to significantly further reduce its reliance on carbon-intensive fossil fuels for electric production as well as for thermal (i.e., heating) needs and transportation

fuels. CLF recommends the following policies and programs to propel this transition away from costly dependence on fossil fuels and toward cleaner energy alternatives:

1. Coal-Free Massachusetts by 2020:

In ranking the fuels that are most inconsistent with achieving the goals of the GWSA, coal is the clear GHG pollution standout and, as such, is a key candidate for rapid phaseout. Despite the fact that Massachusetts is not a coal state, 25% of the electricity generated in the Commonwealth comes from old, polluting coal plants. These coal-fired relics account for almost half of the total GHG emissions from the electric sector in Massachusetts. Coal's disproportionately high contribution to GHG emissions is depicted graphically in Figures 1 and 2 below:

Figure 1: Coal's contribution to MA Electric Supply:

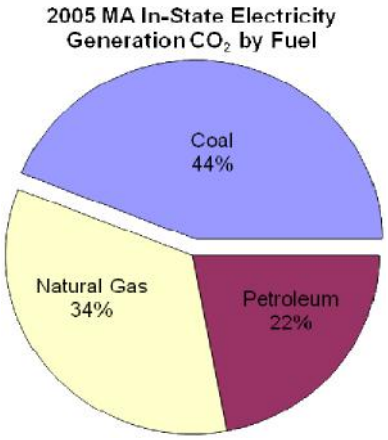
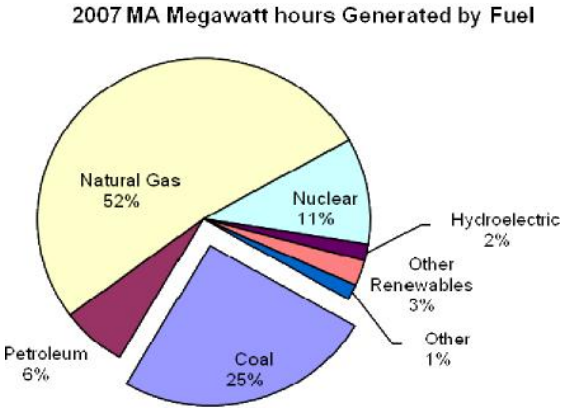


Figure 2: Coal's Contribution to Electric Sector GHG Emissions in MA:



Each year Massachusetts exports $250 million to buy coal instead of investing in local resources such as energy efficiency or renewable energy.[2] Not only does this drain Massachusetts' economy, but it also jeopardizes public health and the environment. Coal combustion emits harmful pollutants such as mercury, particulate matter, sulfur dioxide and nitrogen oxides. In 2008, the Northeast States for Coordinated Air Use Management ("NESCAUM") presented an analysis of the potential benefits from reducing sulfur dioxide, nitrogen oxides and ozone.[3] In one scenario, NESCAUM estimated that Massachusetts could save up to $3 million annually from avoided hospital admissions, asthma emergency room visits, school loss days and decreased worker productivity and between $23.89 million and $136.18 million in reduced mortality.[4]

Eliminating coal from the fuel mix would impose little, if any added costs to Massachusetts ratepayers. Massachusetts' fleet of coal-fired power plants is inefficient and costly to operate in comparison to more modern electric generating facilities. In 2009, coal-fired generation decreased by more than 11% nationwide for economic reasons as its cost became less competitive.[5] Carbon emissions from electric generation decreased by more than 205 million tons due to lower cost natural gas combined cycle units replacing coal-fired power. This trend is more pronounced in New England where efficient natural gas units are displacing coal generation with greater frequency. As one illustration, Salem Harbor Station's owner recently sought to delist the facility from the ISO-NE market because the coal/oil-fired facility is no longer viable (i.e., cannot cover its costs) in the wholesale power market. In upcoming years, the coal fleet is likely to see its market position continue to erode as the trend toward lower-quality coal[6] and tighter environmental standards continue.

The GWSA provides an important tool to move Massachusetts beyond coal, and the CIP should include a commitment to replace the use of coal with cleaner alternatives by 2020, as well as specific policies and programs to achieve this objective. There are a variety of methods for accelerating the phase-out of coal. As an initial matter, Massachusetts should amend the MEPA regulations to establish a mandatory Environmental Impact Report air emissions threshold for modifications to major stationary sources that result in GHG emissions increases of 25,000 tons

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Full report at: http://www.ucsusa.org/assets/documents/clean_energy/Burning-Coal-Burning-Cash_fullreport.pdf

[2] Burning Coal, Burning Cash: Ranking the States that Import the Most Coal, UCS (May 2010).

[3] NESCAUM, *Public Health Benefits of Reducing Ground-Level Ozone and Fine Particle Matter in the Northeast U.S.: A Benefits Mapping and Analysis Program (BenMAP) Study* (January 15, 2008).

[4] *See id*. at Table 5-4.

[5] U.S. Energy Information Administration, 2010 Annual Carbon Report; http://www.eia.doe.gov/oiaf/environment/emissions/carbon/

[6] See, Heinberg, Richard, "The Future of Coal", November 17, 2008.

per year or more. As a signatory to RGGI, Massachusetts should work to increase the required reductions from the power plant sector. ISO-NE, the regional electric grid operator, already has begun to study the potential impact of phasing out coal. Massachusetts should work in its capacity as a New England Power Pool member to advance this study. In addition, the Salem Harbor Station re-use study being funded by the Massachusetts Clean Energy Commission offers a model that could be replicated in each of the communities that currently host coal plants to ensure a smooth economic transition, to facilitate broad stakeholder involvement and to support a comprehensive analysis of the best alternatives ranging from new transmission infrastructure, demand side management, on-site renewables, and/or repowering with natural gas.

Coal-fired power plants take a heavy toll on public health, especially the very young and the very old, and they make up a disproportionate share of the GHG emissions in Massachusetts. Aiming for a coal-free Massachusetts by 2020 is an ambitious, but achievable, goal that would put Massachusetts ahead of the curve in meeting the mandates of the GWSA.

2. *Thermal RPS:*

Massachusetts was one of the first states in the nation to adopt an electric sector RPS more than a decade ago, a tool that has spurred investment in renewable energy generation by requiring electric utilities to supply their customers with increasing amounts each year of electricity generated from renewable resources. No such tool exists to address heating demand, however, despite Massachusetts' extensive dependence on carbon-intensive heating oil and natural gas, and notwithstanding the existence of cleaner alternatives such as solar thermal, geothermal and sustainable biomass thermal units (subject to lifecycle GHG emission reduction requirements). Moreover, the existing Massachusetts RPS for the electric sector may skew incentives such that the most efficient and least GHG-intensive uses of sustainable biomass resources (in thermal applications) are discouraged because they instead are encouraged to be used in less efficient electric generation applications. Based on feedback at the June 2010 public meetings on the Draft CIP and anecdotal reports, there appears to be widespread support for a thermal RPS. The Draft CIP accordingly should include plans for a new thermal RPS that sets escalating targets for deployment of clean heating energy alternatives including solar thermal, geothermal and sustainable, efficient, low-emissions biomass.

3. *Realizing the Potential of Demand Response:*

Particularly in the wake of the enactment of the Massachusetts Green Communities Act in 2008, Massachusetts is making progress in promoting energy efficiency by leaps and bounds. Yet substantial potential for energy *conservation* remains, particularly through deployment of demand response ("DR"). Like energy efficiency, DR is one of the cleanest and cheapest GHG reduction measures available, and appropriately is considered to be a "supply side" resource that competes in ISO New England's Forward Capacity Market. The Massachusetts Green Communities Act provides ample statutory authority for ramping up deployment of DR throughout the Commonwealth. CLF recommends

that the CIP include a specific commitment to DR that should be based on maximum feasible deployment by 2020 (e.g., 1000 MW of new DR by 2020). This specific commitment should be coupled with focused implementation to ensure the target is met.

4. A Significant Commitment to Offshore Renewable Energy:

In order to phase out reliance on fossil fuels for electric generation, Massachusetts clearly needs to tap into substantial available offshore renewable energy resources, particularly offshore wind. Nine years after the 130-turbine Cape Wind offshore wind energy project first was proposed, this critical project finally is within reach of being deployed and beginning to generate enough emissions-free power to supply three quarters of the Cape and Islands' demand. Massachusetts must ensure that this first-in-the-nation offshore wind energy project becomes a reality while also setting the stage for significant further responsible offshore renewable energy development. This should include active implementation of the Massachusetts Ocean Management Plan's elements pertaining to offshore wind energy, ramped up planning for responsible offshore renewable energy development in federal waters off the coast of Massachusetts, and a commitment to specific targets for offshore renewables that will be situated to deliver clean power to Massachusetts (e.g., 2000 MW by 2020).

5. Importation of Canadian Renewables:

To reduce emissions from the energy sector, the draft CIP suggests "increasing imports of low-carbon electricity, through proposed expansion of transmission lines that could import Canadian wind and/or hydroelectric energy." The extent to which new transmission and new imports of Canadian renewable power to advance the goals of the GWSA is not certain. To date there has been little credible scientific evaluation of the GHG effects of large scale Canadian hydro development. It is clear that inundation to create reservoirs causes the release of methane — a very potent GHG — and that these releases are most significant in the early years of operation. We expect additional studies to be available in the fall which will be helpful in assessing the lifecycle GHG implications of Canadian hydro power imports. [7] Before being part of the Commonwealth's strategy, Canadian hydro must be evaluated based on a reliable assessment and quantification of its GHG impacts.

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[7] CLF, together with other Canadian and United States environmental organizations, is undertaking an evaluation of the environmental impacts of large scale hydro imports from Canada. Part of this analysis will include a literature review of the scientific material addressing GHG emissions from hydro development and an independent, scientific review and evaluation of Hydro Quebec's analysis of GHG impacts. To date the project has a paper out for peer review evaluating the potential for hydro development in Canada. *Hydropower Developments in Canada: Number, Area and Jurisdictional and Ecological Distribution* Draft report available at: http://www.globalforestwatch.ca/ .

In addition, the proposed 1200 MW high voltage direct current line proposed as the transmission vehicle for additional Canadian renewable power has not yet been sited and undergone regulatory review,[8] nor have power purchase agreements necessary to make the power available in New England yet been signed. Transmission upgrades needed to import Canadian renewable must be reviewed holistically, fully evaluating the economic, energy and land use impacts. This review should assess the GHG implications of new transmission (including coal by wire), the market impacts, the terrestrial impacts of the transmission route, and broader transmission planning principles including opportunities for energy efficiency and distributed generation to meet power needs in a cleaner and lower cost manner. Because substantial new renewable capacity in and around Massachusetts is an important implementation objective, it is essential to assure that if imported, Canadian renewable energy does not undermine regional renewable development and deployment.

B. ***Transportation Sector GHG Emissions—Background***

For every gallon of gas combusted in a vehicle engine, 19.4 pounds of CO2 is released into the atmosphere.[9] According to the U.S. Department of Energy (DOE), the overall average fuel economy for passenger vehicles was 20.5 miles per gallon (mpg) in 2008.[10] The typical passenger car/light truck, driving an average 11,432 miles per year, emits 4.92 metric tons of CO2e annually.[11] Massachusetts drivers drove 55.4 billion vehicle miles in 2005[12], emitting 26,499,635 tons of CO2. Carbon dioxide emissions from transportation sources in 2005 represented 32% percent of the state's total annual CO2 emissions.[13] The State's total annual number of vehicle miles traveled (VMT) in 2005 represented a 4.2 percent increase over the year 2000 total (52.8 billion).[14]

Data from the EPA MOVES emissions model projects that VMT will continue to rise exponentially in Massachusetts, as it has in the past, exceeding *sixty billion* vehicle miles by the year 2020 if unchecked. *See* Fig. 1

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[8] We note that the federal Energy Regulatory Commission approved only the basic financial structure for development of the line. See, 127 FERC 61,179; Order Granting Petition for Declaratory Order (May 22, 2009).

[9] *See* http://www.epa.gov/oms/climate/420f05004.htm (calculated from values in the Code of Federal Regulations at 40 CFR 600.113-78).

[10] *See* DOE, *Transportation Energy Data Book*, *Edition* 29 ORNL-6985, Tables 4.1 and 4.2 (2010) (Transportation Energy Data Book).

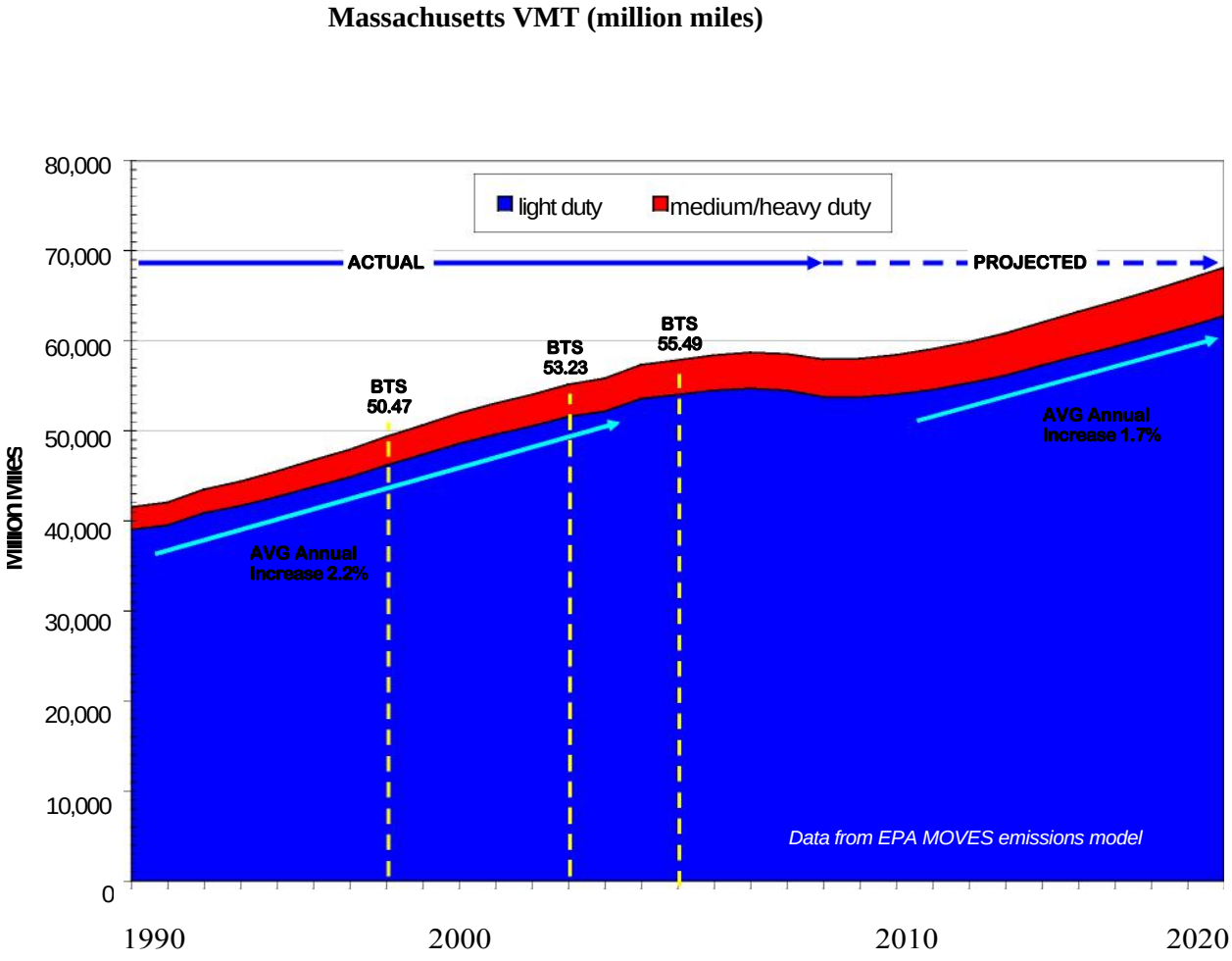
[11] *Id*. (average annual mileage).

[12] *See* http://www.bts.gov/publications/state_transportation_statistics/state_transportation_statistics_2006/html/table_05_03.html

[13] *See* Mass. Dept. of Environmental Protection, *Statewide Greenhouse Gas Emissions Level: 1990 Baseline and 2020 Business as Usual Projection*, *Public Hearing Draft* Table 1 (2009) (*available at* http://www.mass.gov/dep/air/climate/1990bau_drf.pdf).

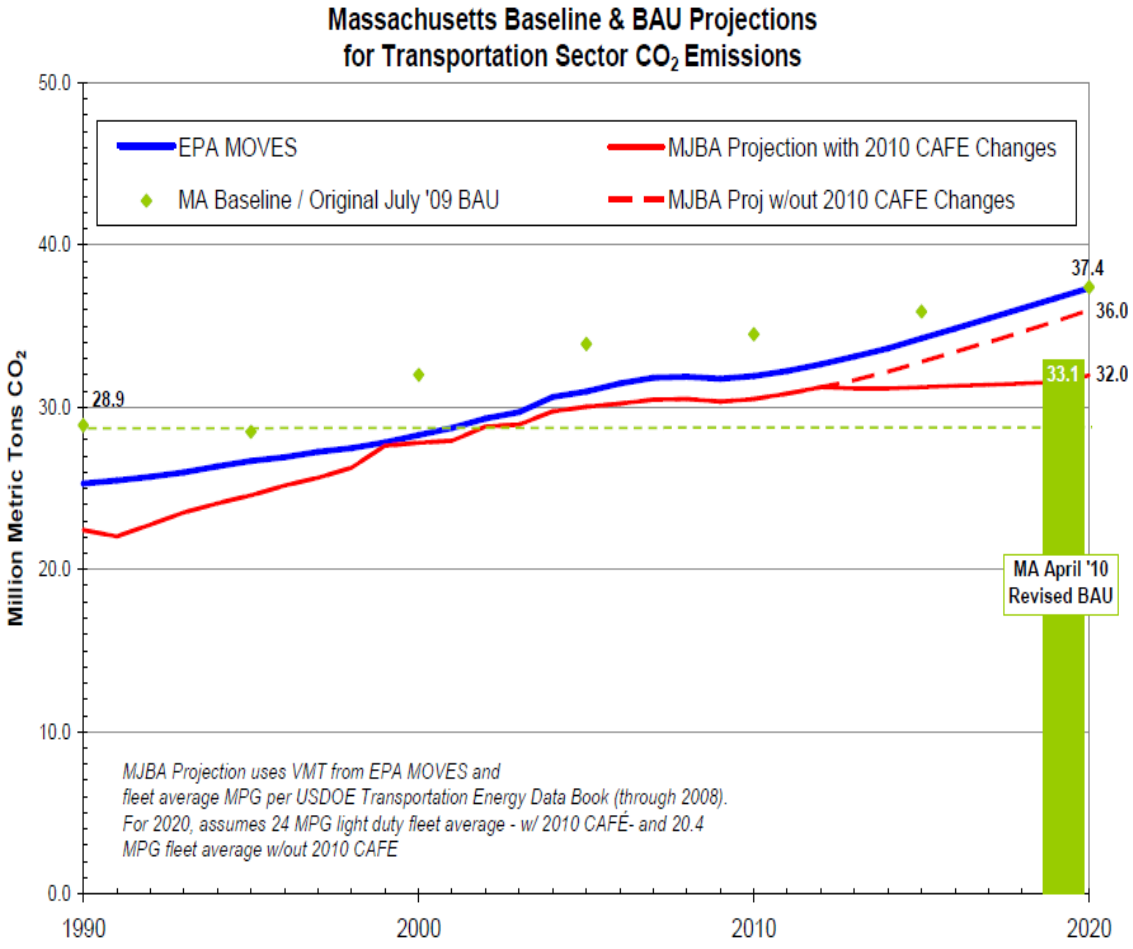
[14] *See* http://www.bts.gov/publications/state_transportation_statistics/state_transportation_statistics_2006/html/table__05__03.html

Figure 1, Massachusetts VMT 1990-2020



Projected 2020 CO2 emissions associated with MA VMT range from approximately thirty-three million metric tons (MMT) to thirty-seven MMT. *See* Figure 2.

Figure 2, MA Baseline and BAU Projections for Transportation Sector CO2 Emissions 1990-2020



As set forth in the Commonwealth's July 1, 2009, 1990 baseline and business as usual (BAU) projection (July 09 Baseline and BAU)[15], the transportation sector in Massachusetts was responsible for 28.9 MMT of CO2 emissions in 1990. As of 2009, the Commonwealth estimated BAU for 2020 transportation sector emissions to reach about 37 MMT. *See* July 09 Baseline and BAU at 7.[16]

Figure 2 shows that EPA, Massachusetts, and our VMT and CO2 emissions trend data are in general agreement and tell an alarming story: Each year, Massachusetts drivers are driving more, and with each additional mile driven, levels of global warming pollution rise. The vast majority of these miles are driven in passenger cars ("light duty" vehicles).

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[15] *Available at* http://www.mass.gov/dep/air/climate/1990_2020_final.pdf.

[16] For purposes of developing that BAU, the Commonwealth apparently did not take into account the impact of certain existing policies on transportation sector emissions reductions, including M.G.L. Chapter 40R, which was passed in 2004, and EPA RFS-1, finalized in 2007. *See* ERG Post-2007 Policy Impact Analysis at 7-8 (including those policies within its analysis of "post-

2007" policy impacts); July 09 Baseline and BAU at 6 (federal renewable fuel standard "not reflected in this projection"). The apparent exclusion of the effects of these policies from the BAU is inconsistent with the requirements of M.G.L. Ch. 21N §3(a).Last spring, the State's consulting team "review[ed] and reanalyze[ed] Massachusetts and federal policies in place prior to 2007, as well as new policies put into place beginning in 2007," to "determine the impact of post-2007 policies" by comparing them to the State's July 09 projected BAU. *See ERG Initial Estimates of Emissions Reductions from Existing Policies Related to Reducing Greenhouse Gas Emissions* (April 30, 2010) (ERG Post-2007 Policy Impact Analysis) at 1.

The ERG Post-2007 Policy Impact Analysis essentially revised the BAU projection, attributing a 2.4 MMT decrease to federal and CA vehicle standards[17]; a 1.8 MMT decrease to the federal Renewable Fuel Standard (RFS-1) and regional Low Carbon Fuel Standard (LCFS); and a 0.1 MMT decrease to assorted land use policies, for a total of 4.3 MMT in additional reductions. *See* ERG Post-2007 Policy Impact Analysis at 4 and 5 ("[t]ransportation policies account for about 4 million tons of the drop"). ERG's analysis produced a BAU that is therefore about 33 MMT in 2020 for the transportation sector. Oddly, ERG's analysis took into account the effect of M.G.L. Ch. 40R (passed in 2004) and RFS-1 (finalized in 2007) neither of which are "post-2007" policies. *See* ERG Post-2007 Policy Impact Analysis at 7-8.

The ERG Post-2007 Policy Impact Analysis could be interpreted to suggest that the Commonwealth now has an easier task—reducing an anticipated 33 MMT of transportation sector GHG emissions to 10-25% below 1990 levels by 2020 as opposed to reducing 37 MMT to 10-25% below 1990 levels by 2020. Such an interpretation, however, would be contrary to the intent of the GWSA.

The GWSA evidences the Legislature's intent that GHG reductions planned and undertaken by the State pursuant to the GWSA be new, or additional—reductions that were not contemplated as of January 2009. *See* M.G.L. Ch. 21N §3(a). The State's efforts to strengthen CAFE had been on-going for several years in advance of the passage of the GWSA, and would have been undertaken notwithstanding the GWSA. The same is true for Chapter 40R. For purposes of achieving the 2020, interim, and 2050 targets, the Commonwealth should rely on additional measures and activities to reduce GHG emissions, not those that would have occurred notwithstanding passage of the GWSA.

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[17] We question the strength of the assumption that post-2016 CA Pavley standards will result in 2020 emissions reductions due to the high probability that such standards will be subject to renewed legal challenges by the automotive industry and associated trade groups delaying or otherwise impeding implementation efforts. Our analysis suggests that, in any event, through 2020, CA Pavley would only have about two years to affect the fleet and would not, therefore, result in a significant amount of turnover to Pavley vehicles or associated emissions reductions. However, the potential effect of CA Pavley—if successfully adopted—from 2020 through 2030, with twelve years of fleet impacts, would be substantial.

Increasing vehicle fuel efficiency, via new CAFE (and post-2016 CA Pavley), will reduce CO2 emissions, yet will do nothing to reduce VMT and does not provide incentives for drivers to drive fewer miles, thereby enabling and maintaining sprawling development patterns.[18] Likewise, lowering the carbon content of fuels is an important strategy to reduce transportation sector GHG emissions, yet that strategy will not reduce the number of miles driven. GHG emissions associated with the projected growth in VMT, if unchecked, will nullify reductions achieved via lower carbon fuel content and increased vehicle fuel efficiency combined.[19]

Massachusetts must put in place now aggressive measures that will reduce VMT by encouraging permanent mode shift and more compact, mixed land use patterns. Such measures will require long term sustainable funding streams.

Transportation Sector Emissions Reductions Strategies

1. The Commonwealth Must Implement Strategies for Increasing Revenue to Support Expanded Transportation Choice

The MBTA's dire financial straits have been well-documented elsewhere, and there is broad consensus that an urgent need exists to identify a sustainable funding stream to support its operations. The need for reliable public transportation options, however, extends well beyond the greater Boston area. Across the state, the Commonwealth must engage the private sector and institutions in generating creative solutions to transportation challenges. At the same time, the State must identify new sources of State revenue to support public transportation.

We commend Massachusetts for joining with the ten other Mid-Atlantic and Northeastern states, along with the District of Columbia, that make up the Regional Greenhouse Gas Initiative to launch the new Transportation and Climate Initiative (TCI). Massachusetts and the other RGGI states are once again leading the nation, with a proven track record of successful, solution-oriented interagency and interstate cooperation. The TCI has stated an overall goal of increasing the energy efficiency of regional transportation systems and reducing GHG emissions from the

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[18] Indeed, driving more fuel efficient vehicles can actually cause drivers to drive more—a phenomenon known as the "rebound effect," which results in a nominal *increase* in VMT. *See* U.S. DOT, Nat'l Highway Traffic Safety Admin., *Corporate Average Fuel Economy for MY 2012-MY 2016 Passenger Cars and Light Trucks, Final Regulatory Impacts Analysis* at 364 (Mar. 2010) ("By lowering the marginal cost of vehicle use, improved fuel economy leads to an increase in the number of miles vehicles are driven each year and over their lifetimes.").

[19] Reid Ewing, Keith Bartholomew, Steve Winkelman, Jerry Walters & Don Chen, Growing Cooler: The Evidence on Urban Development and Climate Change at 2 (Urban Land Institute 2008) ("As the research in this publication makes clear, technological improvements in vehicles and fuels are likely to be offset by continuing, robust growth in VMT. Since 1980, the number of miles Americans drive has grown three times faster than the U.S. population, and almost twice as fast as vehicle registrations.").

transportation sector. The TCI's focus on regional transportation systems is well-aligned with the Obama Administration's goal of promoting regional solutions to transportation challenges, and as a result, this regional focus likely will increase the TCI states' ability to attract much needed federal funds toadvance priority regional transportation projects. The TCI's recent declaration of intent states:

> We understand that the future of transportation and job growth in our states requires forward thinking, the early adoption and deployment of clean energy technologies and a regional approach to clean transportation. We also understand that talking about the future is not enough. We must act.

We agree. We encourage the State to advance a greater emphasis on regional transportation planning—and related land use planning—within its borders, as well.

Gas Tax and VMT Fees

Put simply, getting people out of cars and on to other modes of public transportation requires that other viable, affordable transportation options be available. Because it will take time to plan and expand existing public transportation service and add new service, the Commonwealth must begin now to put in place mechanisms that will generate the revenue necessary for such projects.

We strongly support policies to increase the gas tax and / or assess VMT or similar road pricing fees, so long as any such fees take into account income disparities, and allocate the revenue attributable to any such increase / fee to public transportation. We include in our definition of "public transportation," pedestrian and bicycling facilities.

Massachusetts is fortunate in that, unlike the majority of other states, there is no statutory or constitutional bar prohibiting it from spending State gas tax revenue for non-highway (*e.g.* transit) purposes.

Based on our analysis, the short term elasticity of demand for gasoline is low. What that means is that, when the price of gas increases for any reason, the resulting short term reduction in gas use is relatively low. *See* Cong. Budget Office, Pub. No. 2883, *Effects of Gasoline Prices on Driving Behavior and Vehicle Markets* at 1-2 (January 2008). People generally respond to such increases in the short term by shifting modes, *if* an alternative mode of transportation is available, *e.g.*, taking the train, and by reducing highway speeds to conserve fuel. Longer term elasticity is higher; over a longer period of time, the same level of fuel price increase results in far greater reductions in fuel use, because the primary response is to purchase a more fuel efficient vehicle. *Id*. If competitively priced, convenient, reliable transportation choices existed, however, we would expect to see permanent mode shift result from increased gas prices.

These data suggest that, even very significant increases in the cost of fuel, as a result of increased gas tax, VMT fee, or for any reason, will not, absent significant land use changes and public transportation investments, result in significant fuel use reductions attributable to decreased VMT. Rather, the resulting fuel use reductions are attributable to an increase in fleet average fuel economy as people purchase more fuel efficient cars over time. Accordingly, the key values associated with gas tax increases and / or VMT or similar fees is their ability to (i) generate new, sustainable revenue streams for public transportation investment and to facilitate and/or directly subsidize new compact land use development; and (ii) increase fleet average fuel economy.

For example, a $0.02 / mile VMT fee would generate nearly $1.1 billion for transit in 2011, rising to $1.2 billion in 2020. This would increase the annual cost of "fuel" for the average driver by about $250.00, or 15 percent.

As well, according to the U.S. Energy Information Administration, approximately 2.6 billion gallons of gasoline and 380 million gallons of diesel fuel are sold annually in Massachusetts.[20] The current MA gas tax is $0.235 per gallon; it has not been raised since 1991. If the gas tax merely was indexed to the Consumer Price Index (C PI), assuming the CPI returns to historical levels of about a three percent annual increase, the gas tax would rise to $0.316 per gallon in 2020 and —$0.425 per gallon in 2030. The cumulative incremental revenue that such an increase would produce would be —$1.3 billion through 2020 and —$5.7 billion through 2030.[21] The impact to drivers would be minimal—such an increase represents an additional $40 in annual fuel costs to the average driver in 2020 and an additional $95 in 2030, compared to current fuel tax levels.[22]

More aggressive gas tax price increase scenarios obviously generate substantially greater revenue over a shorter time period. For example, a $0.20 per gallon increase in the gas tax would raise approximately an additional $600 million annually; a $0.30 per gallon increase would raise about $900 million annually; and a $0.50 per gallon increase would raise about $1.5 billion annually. A graduated increase, implemented over time, is perhaps the most feasible strategy.

As vehicle fleets continue to become more fuel efficient over time, revenues generated by state and federal gas taxes will continue to decline. For this reason, it will be necessary to create supplemental sources of revenue, in addition to gas taxes, such as VMT fees.

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[20] These figures square reasonably well with annual gallons calculated from VMT and fleet average MPG data, per DOE and EPA MOVES.

[21] These gas tax revenue projections take into account anticipated increases in fleet fuel economy, which will have the effect of reducing gas tax revenues.

[22] This analysis assumes 12,000 miles driven annually and an average fuel economy of 24 MPG, resulting in 500 gallons annual fuel use.

Other Fees

A $10 special registration fee assessed annually on each of the approximately 5.3 million cars and light trucks registered in MA would yield over $500 million by 2020.

Congestion pricing, area tolling, and other road pricing strategies should be evaluated to ensure that roadway and highway users are paying a fair price for the services provided.

2. The Commonwealth Must Put in Place Strong Incentives To Ensure At Least 75% ofAll New Development is Compact, Mixed Use, and Will Facilitate Increased Transit Use, Walking, and Biking.

The Commonwealth's consulting team has analyzed the GHG emissions impact of directing very large percentages of new development to smart growth locations. *See* ERG, *Cost-Effective Greenhouse Gas Mitigation in Massachusetts: An Analysis of 2020 Potential, Draft Report* (May 3, 2010) (May '10 Report). The May '10 Report concludes that:

> It is estimated that about 200,000 new housing units will be built in Massachusetts between 2010 and 2020—about 7 percent of the state's existing housing stock. **Given appropriate planning and incentives**, the consulting team estimates that there is *potential* to locate 80 percent of these new housing units in smart growth neighborhoods, with residents of those neighborhoods driving about 30 percent less than the average Massachusetts resident. . . . The consulting team estimates that achieving the 80 percent "smart growth" target would reduce VMT for light duty vehicles by 2.1 percent in 2020.

Id. (italics in original, boldface supplied). The Commonwealth should define the attributes of "smart growth neighborhoods," for purposes of this planning process. Assuming the term as used means compact, mixed use, transit-oriented development, the target, while ambitious, is, in our view, the right one to begin to make the shift in current land use patterns required to ensure the level of GHG emissions reductions science tells us is necessary. *See, e.g., Land Use and Driving: The Role Compact Development Can Play in Reducing Greenhouse Gas Emissions* at 11 (Urban Land Institute 2010) (2010 ULI Report) ("To have a significant effect on GHG emissions nationally, compact development must make up a significant proportion of future development—at least 60 percent or even more. This would entail reversing decades-long trends of sprawling development patterns.").[23]

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[23] The 2010 ULI Report reviewed and synthesized the findings of three recent studies concerning the impact of compact development on reducing GHG emissions—Moving Cooler (Cambridge Systematics, Inc. 2009), Growing Cooler (see note 11), and Driving and the Built Environment (Transportation Research Board 2009).

The May '10 Report alludes to a greater anticipated reduction by 2050 as a result of this strategy, yet does not quantify it. For each of the three studies analyzed in the 2010 ULI Report, the percent reduction of total VMT from study baseline equaled the percent reduction of GHG from study baseline. For example, the Transportation Research Board, assuming 75% of new development and redevelopment is compact,[24] projected, by 2050, an 8-11% reduction in total VMT and, correspondingly, an 8-11% reduction in GHG emissions. The Commonwealth should quantify the specific anticipated GHG emissions reductions associated with this strategy for 2020 *and* 2050, given the longer time horizon necessary to produce a more substantial reduction.

As the Commonwealth moves to shift existing development patterns and prioritize transit-oriented development, it should establish early on mechanisms to protect against gentrification and ensure that the benefits of more compact growth, livable cities and towns, and transit oriented development are allocated equitably. Specifically, the Commonwealth must ensure that at least 25% of new transit oriented development, and existing development located near new transit nodes, remains affordable.

Given home rule, the Commonwealth will need to enhance incentives and provide greater technical assistance to local land use authorities to achieve smart growth goals. For example, experience over the years since the State's innovative smart growth zoning overlay law, 40R, have passed has identified key changes in that law necessary to ensure that it achieves the goal of creating more smart growth development.

Many have observed that most 40R projects would have been built under Massachusetts' affordable housing law, M.G.L. Ch. 40B (40B), had 40R not been enacted. Chapter 40B allows developers to build housing that is at least 25% affordable as of right in cities and towns that have not achieved statewide affordability goals. Chapter 40R, in contrast, provides a cash incentive to allow dense, affordable housing to be built. Only 20% of units are required to be affordable under 40R. That suggests the Commonwealth is paying cities and towns in many instances to allow housing that they would otherwise be required to allow under 40B. Since 40R has a lower affordability requirement than 40B, 40R may therefore be causing a decrease in the total number of new affordable housing units built. Other concerns about 40R include the fact that it is a "one size fits all" law that doesn't allow for community differences and that 40R incentives are not compelling to more affluent cities and towns. As well, 40R currently is funded from state surplus lands, and many are skeptical that these funds will be adequate if there is broader participation in the program.

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[24] The 2010 ULI Report defines compact as " a land use settlement pattern that features most or all of the following: concentrations of population and/or employment; medium to high densities appropriate to context; a mix of uses; interconnected streets; innovative and flexible approaches to parking; pedestrian-, bicycle-, and transit-friendly design; and access and proximity to transit." *See* 2010 ULI Report at 3.

The Commonwealth should undertake a careful analysis of the effectiveness of its existing smart growth programs, analyze and identify specific strengths and weaknesses, and propose and implement any necessary changes. The Commonwealth should also identify any policy gaps that should be filled in order to meet the targeted strategy of directing 80% of new development and redevelopment to smart growth locations.

In addition to enhancing the regulatory framework, we strongly believe that we must make our cities and towns better places to live. Current demographic trends show increasing interest in living in compact and urban developments. As development becomes more compact, carbon footprint shrinks, and not just with respect to transportation and land use sectors. We urge the Commonwealth to think creatively about ways to work with cities and towns to make them more livable and responsive to community needs. More clean transportation alternatives mean fewer air pollutants and a healthier environment for urban residents that may not have a choice about where they wish to live. Better schools become an important environmental factor when young families choose to stay in an urban setting rather than move to a suburban or rural location. Incentives that encourage agriculture at the urban core and in exurban and suburban areas result in jobs, increased access to fresh, healthy local foods, and even an increased sense of community. Such measures will be just as important as regulatory tools in facilitating necessary shifts in land use, and provide many important community co-benefits.

3. The Commonwealth Should Continue to Pursue Aggressive Measures to Increase Fuel Economy

Perhaps the single most important step the Commonwealth could take to reduce GHG emissions—starting today, and at no or low additional cost—would be simply to enforce highway speed limits. If 100% of highway traffic in Massachusetts traveled at sixty-five miles per hour instead of seventy-five miles per hour, the estimated annual CO2 emissions reduction in 2020 would be 1.6 MMT, a 4.7% reduction from the ERG's April 2010 revised 2020 projection. If 100% of highway traffic traveled at fifty-five miles per hour instead of seventy-five miles per hour, the estimated annual CO2 emissions reduction in 2020 would be 2.5 MMT, a 7.3% reduction. [25] Given the very substantial emissions reductions associated with this strategy, which merely requires enforcement of existing law, the Commonwealth should immediately begin to implement increased enforcement measures. Increasing fines for speeding and/or requiring additional mandatory driver education could provide additional incentives for drivers to maintain lawful highway speeds.

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[25] This projection assumes fuel economy of 32.4 MPG at 55 MPH versus 29.2 MPG at 65 MPH and 24.8 MPG at 75 MPH. *See* Transportation Energy Data Book, *Edition 28*,ORNL-6984, 2009, Table 4.26. This data is from a 1997 study of model year 1988 — 1997 cars and light trucks. This also assumes that 35% of all VMT are on the highway.

Other "eco-driving" measures identified in the DCIP to encourage more efficient individual driving practices (more gradual acceleration and deceleration, keeping tires fully inflated) are impossible to enforce. It is unlikely that funding additional education and outreach to promote these practices would yield significant reductions, and for that reason this strategy should not be a focus of the final CIP.

Massachusetts should continue to press for more stringent new vehicle fuel economy standards after the 2016 model year. Along with the other Clean Air Act 177 states that adopted CA Pavley, Massachusetts was instrumental in ensuring that the federal government ultimately adopted strong national CAFE standards that are substantially similar to CA Pavley and will result in significant fuel savings and CO2 emissions reductions.

Massachusetts should assess incentives to encourage drivers to purchase more fuel efficient vehicles, thereby facilitating more rapid fleet turnover to fuel efficient vehicles.

4. The Commonwealth Should Support and Facilitate Voluntary Market-Based VMT Reduction Programs Such as Pay As You Drive (PAYD) Insurance

Pay-As-You-Drive (PAYD) is a mileage-based insurance program in which users pay a cents-per-mile rate based on actual mileage traveled. PAYD pricing "rewards motorists for reducing mileage and makes premiums more accurately reflect the insurance costs of each individual vehicle."[26] By presenting users with a marginal price for each mile driven in lieu of a yearly lump sum payment, PAYD offers the promise of reducing VMT and corresponding accident costs along with fuel consumption and GHG emissions. Importantly, PAYD is a valuable market-based tool for encouraging voluntary reductions in VMT and is being considered by many states as a GHG reduction strategy.

Currently in Massachusetts, purely PAYD auto insurance is not available but one insurance carrier, Plymouth Rock Assurance, markets a partially mileage-based product through the Environmental Insurance Agency (www.eiainsurance.com).[27]

Preliminary findings from a joint study being conducted by the Massachusetts Institute of Technology and CLF Ventures, Inc. ("Ferreira and Minikel 2010") linking actuarial data to mileage data for Massachusetts drivers over several recent years confirms that, as suggested by modeling, PAYD can reduce VMT significantly.[28]

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[26] *See* Todd Litman, *Pay As You Drive Insurance: Recommendations for Implementation* at 2 (Victoria Transport Policy Institute Dec. 2009).

[27] EIA is a subsidiary of the Conservation Law Foundation.

[28] Ferreira and Minikel 2010.

The study estimates a 9.5% reduction in VMT (aggregate VMT for 2011 would be 9.5% lower than aggregate VMT for 2010) if all drivers in Massachusetts switched to a strictly per mile PAYD insurance plan. A 9.5% reduction in VMT would reduce fuel use by 9.3%, yielding nearly 2 MMT of CO2e reductions by private automobiles. The study estimates a 5.0% reduction if all drivers switched to a plan with 2,000 miles bundled into a yearly fee with per mile pricing thereafter. A 5% VMT reduction would equate to at least a 2.1 billion mile reduction in VMT, an approximately 4.9% reduction in fuel use, and a 1 MMT CO2e reduction. Roughly proportionate reductions would be achieved if fewer than 100% of drivers participated in PAYD.[29]

The research also suggests PAYD would improve fairness by shifting weight in insurance pricing towards an individual controllable factor, mileage, rather than involuntary groupings, and by reducing or eliminating the cross-subsidy from low to high mileage drivers.[30] For low-income households, PAYD would create an opportunity to save money by choosing to reduce mileage, make low-mileage car ownership more feasible and reduce the toll of auto-related externalities on the non-car owning poor.

The Commonwealth should actively shape the market for PAYD products. The first step is to remove any existing regulatory barriers to PAYD products by reforming auto insurance regulations to allow for per-mile auto insurance products. Since risks and startup costs might slow the private sector's entrance into the PAYD market, the Commonwealth should first establish and fund a state-wide PAYD auto insurance pilot program involving all carriers. With lessons from the pilot, the Commonwealth should require all insurance carriers offering coverage to Massachusetts drivers to make PAYD insurance available to consumers and provide information about PAYD at point of sale and on an annual basis as part of the insurance renewal process. The Commonwealth should consider establishing an auto insurance savings incentive program with incentives for insurance providers to sell automobile insurance policies on a per-mile traveled basis to encourage the transition to PAYD. The Commonwealth should also consider putting in place additional consumer incentives, such as reduced registration fees, to encourage greater PAYD participation and educate consumers through the registry of motor vehicles about the benefits of PAYD.

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[29] For example, if only 50% percent of drivers participated in PAYD under a no upfront cost scenario, we could expect an approximately 4.75% VMT reduction. Assuming that the first half of drivers to subscribe would be those who would save money (since they are already low-mileage drivers) we anticipate, however, that total VMT likely would be reduced by slightly less than half.

[30] Ferreira and Minikel 2010.

5. The Commonwealth Should Ensure that MassDOT's GreenDOT Policy is Consistent with the DCIP and Will Achieve Projected Reductions

MassDOT's GreenDOT policy, announced in May 2010, is a significant step in the right direction. Overall, the GreenDOT policy is largely consistent with the DCIP. However, of the primary activities MassDOT has identified to achieve GHG reductions, *see* GreenDOT Policy Directive at Exhibit A, we note that MassDOT lacks jurisdiction over several. *See, e.g.*, M.G.L. Ch. 21N §4(a) (The secretary shall consult with all state agencies and regional authorities *with jurisdiction over sources ofgreenhouse gases* on all elements of the emissions limit and plan . . .") (emphasis supplied).

For example, MassDOT is not the agency authorized to enforce highway speed limits— the single most effective "eco-driving" strategy. Nor is MassDOT the agency responsible for corporate average fuel economy of the State's fleet. While MassDOT can and must support smart growth, its ability to control that outcome is shared with numerous land use authorities. MassDOT's central authority is transportation planning and investment. To that end, we applaud MassDOT's commitment, set forth in the GreenDOT directive, to align the Strategic Plan, Capital Investment Plan, long-range Regional Transportation Plans, Regional Transportation Improvement Programs, and State Transportation Improvement Program with GreenDOT goals, and specifically with the goal of reducing GHG emissions. MassDOT's specific recognition of the need to "balance highway system expansion projects with other projects that support smart growth development and promote public transit, walking, and bicycling," and prioritize such projects, *id*. at Exhibit B, is particularly laudable.

The policy is conspicuously silent, however, with respect to the achingly obvious need to identify sufficient, sustainable funding streams to implement these goals. For example, even as the GreenDOT plan was released, MassDOT was and is continuing to maintain that the State Implementation Plan requires it to extend the Green Line only to College Avenue at Tufts, thereby continuing to ensure that thousands of people, many from environmental justice communities, will have no reliable transit service. And on July 9, 2010, MassDOT announced that completion of the Green Line would be delayed (it is required by law to be completed by 2014) until at least October 2015.[31] MassDOT and the Commonwealth, as discussed above, must identify new revenue streams to support the urgently needed transit investment that will allow us to provide real transportation options to Massachusetts residents.

We also question whether the projected emissions reductions associated with MassDOT's proposed activities are overstated. The table below provides the level of VMT reduction that would need to be obtained by virtue of the identified policies in order to achieve the estimated GHG emissions reductions:

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[31] *See* _http://www.boston.com/news/local/massachusetts/articles/2010/07/11/long__awaited__green__line__extension__to__somerville__medford__delayed__again/

Table 1, Projected GHG Emissions Reduction Feasibility Analysis, M.J. Bradley & Associates

Policies	GreenDOT Projected 2020 GHG Reduction (MMT)	Feasibility Analysis
Reduced GHG emissions from construction and operations, more efficient fleets, travel demand management programs, eco-driving, and mitigation of development projects	1.53 (5.3%)	Absent significant average highway speed reduction, this projection implies that either VMT would be reduced by about 6.5% (unrealistic), or that average fleet fuel economy will increase from 24 MPG to 26 MPG, an 8% improvement by 2020 (potentially possible with a hefty—$0.50 per gallon—gas tax).
Reduced automobile travel resulting fromMassDOT transportation investments that improve pedestrian, bicycle, and public transit infrastructure and operations.	0.20 (0.7%)	This would require about 3.5% of all MA residents to convert one fourth (7.7 miles) oftheir daily travel from personal automobile to walking, biking, or transit by 2020. This is possible, however, MassDOT has not identified any plan for securing the necessary revenue to make such investments.
Reduced automobile travel that is enabled by denser, smart growth development patterns	0.38 (1.3%)	This would require about a 1.6% reduction in VMT in 2020. That result might be possible if 25% or more of "new development" between now and 2020 rigorously adhered to "smart growth" principles, including: (i) doubling (or more) the density of suburban sprawl (ii) providing mixed-uses (work, shopping, residential); and (iii) developing pedestrian and transit facilities/investments.
TOTAL REDUCTION	**2.11 (7.3 %)**	

EOEEA and MassDOT should continue to refine and improve the GreenDOT policy to ensure that MassDOT's proposed measures will actually achieve the projected GHG emissions reductions within the mandated timeframe.

6. The Commonwealth Should Continue to Promote Expanded Passenger and Freight Rail

Massachusetts has made significant strides in passenger and freight rail investment over the past three years, attracting over $500 million in new investments.[32] Coordinating with the other New England states, Massachusetts has developed a "Vision for the New England High Speed and Intercity Rail Network."[33] We understand that MassDOT is now engaged in developing a freight companion to the regional passenger rail vision, and we commend the State for its efforts to bring a regional focus to freight rail expansion.

Currently, only about seven percent of the goods received in Massachusetts are transported by rail, with most being transported by truck. Strategies to shift increasing volumes of freight transport from trucks to rail should be an important piece of the Commonwealth's GHG emissions reduction plan for the transportation sector.

For purposes of both providing a less carbon intensive transportation mode, and promoting mixed, compact, transit-oriented development, the benefits of passenger rail— as part of an integrated transit system—cannot be overstated. Rail stations can serve as powerful engines of sustainable, economic development, and should be located in places planned for compact development. Different types of rail (*e.g.*, intercity, commuter, and light rail) should be coordinated with one another, as well as with bus transit and pedestrian facilities, to enhance their effectiveness and enable citizens to rely less on cars.

C. Reducing GHG Emissions by Moving from Waste Management to Materials Efficiency

Although every New England state has placed waste reduction and recycling at the top of the waste management hierarchy, recycling rates remain low, and in recent years, recycling rates have either fallen or remained stagnant. Funding for recycling and waste reduction programs typically are scarce because even revenues from measures that promote recycling (such as bottle bills) are often siphoned off into general funds. Although the Draft CIP includes recycling as one of many plan elements, Massachusetts needs to establish a far more comprehensive plan for reducing GHG emissions from solid waste that includes promoting extended producer responsibility, sustainable use of organics and recycling performance standards.

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[32] *See* The Massachusetts Rail Program (June 2010), available at http://www.massdot.state.ma.us/transit/Documents/MARailProgram.pdf

[33] - *See* Vision for the New England High Speed and Intercity Rail Network, available at http://www.mass.gov/Agov3/docs/PR071309.pdf

1. *Extended Producer Responsibility:*

According to the U.S. Environmental Protection Agency (EPA), the extraction, production, transport, and disposal of goods accounts for approximately 29 percent of all man-made greenhouse gas emissions. Greater reuse and recycling of consumer products and packaging is a powerful greenhouse gas reduction strategy, and those with the greatest ability to reduce the impacts associated with the various phases of production and disposal of products should shoulder the responsibility and costs. Requiring producers to bear the costs of disposal not only results in waste reduction (and thus reductions in GHG emissions from land-filling), but it also has the co-benefits of reducing the use of toxic materials in products and conserving natural resources.

CLF recommends that Massachusetts take action immediately to enact legislation expanding the bottle bill and regulating electronic waste. CLF also recommends that Massachusetts work with Maine (which recently enacted the nation's first EPR framework law in March 2010) and other New England governors to establish a regional EPR framework.

2. Organics

Organic materials make up a significant portion of the waste stream currently disposed of in landfills, but existing methods of calculating GHG emissions from waste often fail to fully account for organics. CLF recommends that Massachusetts establish a program to deal explicitly with organic materials by increasing incentives for composting and anaerobic digestion as well as supporting the creation of infrastructure necessary to collect and transport these materials.

3. Recycling Performance Standards

Though Massachusetts has set recycling goals, there is no mandate to achieve them. The adoption of mandatory targets, modeled upon European Union programs, along with an incentive or penalty (such as additional funding contingent upon reaching the targets), would increase the diversion of materials from landfills while allowing municipalities and solid waste districts flexibility to determine how best to achieve these targets.

D. *All in the Balance: Maintaining Healthy Forests and Associated GHG Uptake*

No Net Loss of Forest Carbon Sequestration Capacity by 2020:

One of the key components of the 1990 greenhouse gas baseline for Massachusetts is the biogenic emissions sector, including an estimated 8.6 $MMTCO2_e$ sequestered by forests annually, 2.2 $MMTCO2_e$ annual emissions from land use change emissions, and approximately -1.5 $MMTCO2_e$ annual net biogenic emissions. In other words, the Commonwealth's forests are acting as an enormous carbon sink, removing from the atmosphere roughly 10% of the greenhouse gas emissions produced in Massachusetts each year. If Massachusetts is to achieve the greenhouse gas emission reductions required by the GWSA, as it must, the CIP needs to

include measures specifically directed at maintaining healthy forests and maximizing their carbon sequestration potential.

CLF proposes a policy and associated programs to achieve the goal of No Net Loss (NNL) of forest carbon sequestration capacity by 2020. While such a policy may appear daunting, it ought to be readily achievable given factors including the following: (a) forest sequestration capacity in Massachusetts is understood to be gradually increasing as the Commonwealth's forests mature; (b) smart growth policies are likely to reduce the overall amount of land use conversions and associated greenhouse gas emissions; and (c) significant efforts are underway to promote forest conservation (and associated forest carbon sequestration) in Massachusetts, including the Forest Futures Visioning process, public and private land conservation programs, etc. In addition, tree plantings in developed areas hold potential not only for increasing GHG uptake but also for providing shade that reduces demand for cooling on hot summer days.

E. ***Comprehensive Measures Extending Across Sectors***

1. Pricing GHG Emissions Commensurate with Societal Costs

Increasing atmospheric concentrations of GHGs in the atmosphere are inflicting significant societal costs, which the GWSA seeks to mitigate. These costs include adverse effects to ecosystems, public health, the economy and private property. An optimal reduction strategy must include a mechanism for imposing a cost for GHG emissions to deter emissions that result in public harm.

As a participant in the RGGI program, Massachusetts recognizes that pricing carbon provides an incentivize for innovation, efficiency and new technology deployment. To achieve the GHG reduction goals of the GWSA, Massachusetts and its RGGI counterparts need to expand the program to additional major emitting sectors including large stationary sources and fuel combustion in the commercial, industrial, and transportation sectors. The 2012 RGGI program review provides an opportunity to further align the goals of the GWSA with environmental policies implemented in Massachusetts. Allocating the true societal costs of GHG emissions to their sources, through an appropriate carbon pricing policy, should be included in the final CIP.

2. Everyone has a Role to Play in Meeting Massachusetts' GHG Reduction Targets: the Final CIP Should Include Plans for Public Education and Outreach

Particularly in order to set the stage for meeting the GWSA's deep GHG reduction target for 2050, public education and outreach are essential and should be ramped up without delay. Everyone is responsible for GHG emissions and thus has a role to play in reducing those emissions. In addition, transitioning away from business as usual offers significant and wide-ranging opportunities, including substantial prospects for high quality new jobs ranging from weatherization, energy efficiency and renewable energy installments to research and development regarding innovative new solutions. Accordingly, the CIP should lay out meaningful plans for public education and outreach, including opportunities for members of the

public to continue to play a role in shaping the Commonwealth's efforts to successfully reduce GHG emissions.

3. Evaluation Tools are Essential

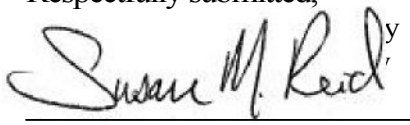
Although the Draft CIP is forward-looking by design and is not intended to measure past or current emissions reductions, as the final CIP is developed we encourage you to identify robust tools for evaluating, over time, the actual success of the emissions reductions measures that form the basis of the report's estimates.

Conclusion

Massachusetts is off to a promising start in realizing the goals of the GWSA. CLF recommends that the Secretary set a 2020 GHG emission reduction target of 25% below 1990 levels, and that the CIP be augmented with the measures outlined above in order to meet this 2020 target while also setting the stage for the deeper reductions required by 2050.

We look forward to continuing to work with the Patrick Administration, the Climate Protection and Green Economy Advisory Committee, and other stakeholders to design and implement an ambitious yet feasible Climate Implementation Plan.

Respectfully submitted,



Climate Change Initiative Conservation Law Foundation
62 Summer Street
Boston, MA 02110
(617) 850-1740

Melissa Hoffer, Esq.
Director, Healthy Communities and Environmental Justice Program
Conservation Law Foundation
27 North Main Street
Concord, New Hampshire 03301
(603) 225-3060

Jendi Reiter, Friends of the Upper Roberts Meadow Reservoir and Dam

From:	Jendi Reiter
To:	"Strategies, Climate (DEP)" <Climate.Strategies@state.ma.us>
Date:	7/15/2010 2:17 PM
Subject:	FW: Regarding: Global Warming Solutions Act

To Whom It May Concern:

Please add my support for the initiative below. Western Mass. needs investment in renewable energy sources such as micro-hydro power, to help our economy grow without sacrificing the natural beauty that makes our region a great place to live.

Thanks,

Jendi Reiter

Attachments:
Copy of comment submitted by Adam Cohen.
Copy of comment submitted by John Clapp.
Copy of comment submitted by Paula Deslauriers of Co-Act.

Robert Rio, Associated Industries of Massachusetts

Leadership is our business
Associated Industries of Massachusetts
222 Berkeley Street | P.O. Box 763
Boston, MA 02117-0763

www.aimnet.org | 617.262.1180 | fx 617.536.6785

By email to climate.strategies@state.ma.us

July 15, 2010

Massachusetts Department of Environmental Protection
Bureau of Waste Prevention One Winter Street 6th Floor Boston, MA 02108
Attn: Lee Dillard Adams
Re: Comments to Proposed Draft Climate Implementation Plan resulting from the Global Warming Solution Act

Dear Ms. Adams:

AIM appreciates the opportunity to comment on the above proposal. AIM is the largest nonprofit, nonpartisan association of Massachusetts employers, representing over 6000 member companies, including many companies that will be impacted by this proceeding.

The above proposal sets out the basic framework for implementation of programs to meet the goals of the 2008 Global Warming Solutions Act (GWSA). The GWSA requires the Secretary of the Executive Office of Energy and Environmental Affairs (EOEEA) to set emissions reduction goals for greenhouse gases between 10-25% by 2020 and 80% by 2050 with milestones in between (based on 1990 baseline data). An analysis of carbon reduction strategies already on the books and potential cost effective one has determined that the Commonwealth is on track to meet 19% by 2020 and may even have a potential for "low or no cost" reductions of 35% by 2020.

The reductions are expected to come from three sectors: transportation, buildings and energy supply. Our comments will be focused on the commercial, industrial and energy sectors position to comment on these programs. As you know, AIM is member of the Energy Efficiency Advisory Council (created under the Green Communities Act of 2008) and has been an enthusiastic supporter of energy efficiency and has been intimately involved with energy efficiency and energy supply for decades.

Although the background document states that the Commonwealth is on track for a 19% reduction in greenhouse gas emissions with laws already on the books, AIM urges EOEEA to be cautious when using such predictions to establish even more aggressive goals.

First, it is not certain that some of the proposals on the books will actually be implemented in the time frame or manner expected or even result in expected greenhouse gas reductions. For instance, the Massachusetts Advanced Biofuels Mandate was recently suspended due to "lack of supply, lack of blending facilities, or unreasonable cost" (see DOER Program Announcement, June 30, 2010). Even modest delays in implementing some of these programs could have a profound impact on meeting any goal and as time goes on other programs, including energy efficiency and renewable projects, may experience delays. The 10-year time frame is simply too short to rely on reductions from programs with short track records and it leaves little time to develop alternatives should some not be successful.

Second, setting a modest, yet achievable goal does not mean the Commonwealth cannot exceed it. Many of the programs already on the books were adopted independent of the GWSA. Some, like the goals related to transportation efficiency are federal in origin while many state only programs such as energy efficiency and renewable programs were adopted independent of the GWSA and will continue no matter what ultimate goal is established.

Reducing greenhouse gases in only one state, especially given the Commonwealth's emissions profile, will not easily be accomplished beyond the proposals already on the books. We have very few sectors where large reductions can be expected. Setting too high a standard or going beyond statutory reductions (as suggested by commenters at the public hearings), however, will subject Massachusetts consumers and residents to laws and programs that have questionable cost benefit and are far beyond what is required in other states. This often creates confusion and a perception that Massachusetts will always be an outlier. This is particularly important as the federal government may develop a national carbon program precisely so that a greenhouse gas program will be predictable and fair. EOEEA should set goals with the understanding that such goals (and programs to reach those goals), could be easily assimilated into any federal program.

Ironically, Massachusetts is the last place we need these reduction targets. By any measure, emissions of greenhouse gases per capita in Massachusetts are near the lowest in the country. This is at least partly due to the migration of manufacturing from Massachusetts to states where energy prices (and environmental constraints) are much lower. Since greenhouse gases are global pollutants, this migration has the effect of actually causing increases, not decreases, in worldwide emissions of greenhouse gases. EOEEA needs to be mindful that such migration does indeed occur.

It appears in the DEP presentation that growing a clean economy and reducing the cost of energy are dual goals of this implementation plan. While they are not always mutually exclusive, sadly, we do not think the Commonwealth is accomplishing either. For instance, several pieces of legislation have been signed into law in the last two years relating to energy and greenhouse gas reductions. In DEP's presentation at the public hearings, six are listed.

Just one - The Green Communities Act - has spawned numerous administrative and regulatory programs, including new energy efficiency charges, new solar carve out charges, increases in the renewable portfolio standards, an ability to initiate long term contracts for renewables, net metering, smart grid and others. These do not even represent all the programs recently enacted, including decoupling orders for electric and gas utilities, by which utilities are allowed to recapture reductions in use by increasing prices to make up for any revenue shortfall.

These disparate and sometimes conflicting programs have already added over 4 billion dollars in additional charges to ratepayers. If Cape Wind is approved the total could be well over 6 billion. This is particularly problematic as Massachusetts is already the location of the highest electricity costs in the nation.

While some programs, like enhanced energy efficiency, may reduce costs (although the actual impact to these reductions on ratepayer bills is subject to much discussion), the fact of the matter is that everything has a cost impact. Individually, the programs may be manageable but taken together the cost is staggering and just starting to show up on consumer bills. It is actually nearing the point where any savings gained through energy efficiency are absorbed by costs of other programs.

Also, there is little evidence to support the notion that thousands of jobs are being created unless one discounts or avoids including the job losses that are occurring due to the high priced of energy or selectively uses cost-benefit analysis of individual programs. The reason is simple. Almost all of the subsidies that have been used to foster these green jobs have come from one segment of the population – the ratepayers of investor owned utilities, about 85% of the state's population. Essentially, these program amount to a tax on energy. While one could certainly argue that the recipient of the tax creates jobs, clearly the payer of the tax has less money to invest in products or plant upgrades or pay their employees.

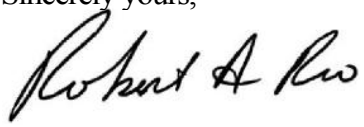
A focus on one pollutant – in this case greenhouse gases – also can have a detrimental impact on other programs, since programs which may not reduce greenhouse gases (but may reduce other pollutants) are not supported or projects which reduce greenhouse gases are supported unequivocally without regard to cost. Ironically, in some cases, in particular some alternative energy projects, an environmental problem may actually be transferred from one pollutant to another or may be moving the carbon emissions out of state. If EOEEA is going to be consistent, life cycle analyses should be performed for any program which alleges to reduce carbon to make sure these programs are not merely moving the problem someplace else.

Efforts to prioritize programs that reduce greenhouse gases should be based on one principle and one only: we should institute the cheapest programs first. Capital is finite and EOEEA has an obligation to develop programs that use ratepayer dollars and tax dollars efficiently.

Many of AIM's members are already leaders in reducing their environmental impact across all sectors and we look forward to working with EOEEA to continue to craft balanced, real and cost-effective programs to further reduce greenhouse gases and other pollutants.

Should you have any questions please do not hesitate to contact me at 617-488-8308.

Sincerely yours,



Robert A. Rio

Senior Vice President and Counsel

Barbara Rokosz

From: "Rokosz, Barbara M."

To: "'climate.strategies@state.ma.us'" <Climate.Strategies@state.ma.us>

Date: 7/15/2010 3:15 PM

Subject: RE: MEPA GHG EMISSIONS

RE: REVISED MEPA GREENHOUSE GAS EMISSIONS POLICY AND PROTOCAL

Thank you for the opportunity to submit comments on these procecures.

First, I think the State needs to begin to incorporate cumulative effects into their permitting process. Many projects now, get through permitting because the modeling they use is only for THEIR SPECIFIC project. Never taking into consideration the existing air quality.

Second, the State needs to seriously begin looking in the immediate area of the project. Although the site may have the accecptable zoning it may not be suitable for a particulate project. the air quality may already be compromised by heavy truck traffic.

Third, in the case of power plants specifically, the gas/oil fired, they should be built using carbon capture technology. Because these plants also emit large amounts of other potentially health hazardous chemicals they should NOT be allowed to built within 2 MI of any school, elderly complex or residence.

Fourth, no power plant that uses NON Renewable energy sources, eg. natural gas, oil, coal should be allowed to be built within 1 mi radius of wetlands, streams, lakes, ponds, rivers since CO2 causes waters to become more acidic, thereby changing the composition of those waters. According to Prof Raymond Bradley, Prof UMASS @ Amherst, our oceans are becoming more acidic because of CO2 emissions leading to potential problems.

Fifth, No project that emits over a certain amount of CO2, should be permitted in an area where any school is within a 1 mi radius without first having an air quality report being completed by the use of an actual air monitor paid for by the proponent for a period of time (6 mos - 1 yr).

Sixth, If the State is serious about reducing CO2 emissions then set a limit for CO2 for Cities/Towns/Communities. Any project that would push the City/Town/Community over this limit would not be permitted to site there. I think we are all willing to do our share to reduce our carbon footprint, but get disillusioned when the State then turns around and may allow a project that puts an additional 1.3 MTPY of CO2 into the atmosphere that is already rated an"F" by the American Lung Association.

Thank you for your consideration to these concerns

Barbara Rokosz
Westfield Concerned Citizens
Westfield, MA

Grace Ross, Gubernatorial Candidate

Testimony for the Executive Office of Energy and Environmental Affairs Public Hearings on the Global Warming Solutions Act

My name is Grace Ross, resident of Worcester, most recently running for Governor of the Commonwealth. I apologize in advance for the extent of this testimony; however, I was the principal leader in an effort three years ago called The Massachusetts Blueprint where we laid out a plan in principle with a lot of details going forward for lifting Massachusetts' carbon footprint. In that context we developed a holistic way of looking at and addressing numerous interactive factors in the effort to reduce greenhouse gas emissions in Massachusetts.

First I want to thank the administration, not only for having these hearings, but the legislature for attempting to move forward a process that would actually plan forward around global warming and the Massachusetts contribution. I am particularly pleased that there is going to be an attempt to model a planning process to include a lot of key factors. I want to start by addressing some of the initial goals of the hearings.

The most critical one I believe is that we've been asked, as the public, to decide what percentage below 1990 levels of greenhouse gas emissions in Massachusetts we would prefer; somewhere between 10 and 25 percent. The committee responsible for the drafting of this plan has put forward clear evidence that we have not wandered that far from 1990 levels already and that with existing greenhouse gas related legislative and program changes (or ones that are in the pipeline), we're on track for hitting 17 or 18 percent below 1990 levels. The committee has also identified simple steps that they believe are easily attainable (assuming that our initial figures are correct) for possibly reaching a 35 percent reduction.

This is one of those opportunities where I would like to see the governor actually take some real political leadership rather than staying within the narrow guidelines of the legislative goals defined in the Global Warming Solutions Act. The governor can actually lead and propose a 35 percent goal, understanding that one does not always reach goals. It is not unreasonable to put forward a goal, in fact, it is very reasonable to put forward a goal of 35 percent reduction And the administration should bring this back to the legislature. We understand that when the legislature set the goal of 10 to 25 percent below greenhouse gas emission levels of 1990 that that was a hand wave; they had none of the evidence that has been brought together so far, not the existing study on where we stand now. That 10 to 25 percent reduction seemed no doubt like a reasonable but significant reach on the part of Massachusetts; however, it turns out it is not. And I am quite certain having been party to a lot of the debates around the Global Warming Solutions Act that it was the intent of the legislature to reach for a not insignificant goal; therefore, it would be in fact missing the intent of the legislation to *not reach for a significant goal*; 35 percent reduction sounds like would meet that intent – as a very reasonable goal.

The second thing that I want to address is that the mission of this strategy includes savings for consumers. I am deeply concerned and I've testified at one of the hearings in more detail on this matter, but I am deeply concerned that one of the huge benefits of renewable energy and of conservation is that if it's done properly the benefits should accrue easily to consumers. The financial benefits as well as the

environmental benefits. That is one of the stated criteria for success for the Global Warming Solutions Act process, but we are not seeing that as a priority in even the planning process so far in some key ways; truly prioritizing that goal may mean that again, the administration needs to go back to the legislature and show some leadership on some specific legislative changes.

We know, for instance, that one of the biggest developments currently on the drawing board is Cape Wind. Cape Wind is going to be spending a lot of tax payer dollars as our portion of the per kilowatt subsidy is 6.1 cents. If my dollars as a tax payer are going to be spent on this it seems to me that benefits should accrue to Massachusetts. In the Global Warming Solutions Act, another criteria is valuing the development of green industry in Massachusetts and specifically green jobs. I believe there is no acceptable reason for why a large sum of money (which it will be over time, subsidizing renewable energy, through for instance, Cape Wind) should not carry with it an expectation that the windmills that they purchase will be U.S. made and that at least components will be made inside of Massachusetts. For some reason, it is not part of the assessment of the state in approving the license for them to build, that those jobs to construct the windmills should come here. That seems to me in direct contradiction to the purpose of the Global Warming Solutions Act and in direct opposition to creating the kind of ground swell of public support that we want to see and that will be necessary to create the significant social transition to sustainable and non-carbon polluting energy system in our lives in Massachusetts.

Secondly, I was deeply concerned, and I will leave the details of this again to my prior testimony, but I was deeply concerned that the National Grid contract with Cape Wind was based on a 20.7 cents per kilowatt hour cost and that when I pointed out that this means that we as taxpayers will be both providing a 6.1 cents subsidy and presumably rate payers are going to have to pick up any ways in which wind energy runs more expensive than carbon-based coal, gas, or oil. I was assured by the hearings officer at the hearing where I raised this that from National Grid's perspective since there's a 6.1 cents public subsidy per kilowatt hour anyway and they therefore didn't need to factor that in to their calculations that the amount they were contracted to pay per kilowatt hour (once Cape Wind is up and running) was a good deal for them in comparison to existing costs for gas, coal, and oil. Coal and oil are incredibly costly in terms of our carbon footprint and the idea that wind energy, which does not have long term fuel expenses attached to it, is being contracted out now at a rate higher than the existing costs for coal, oil, and natural gas instead of at a rate that is significantly lower even for National Grid is disturbing and economically counterproductive. The whole point in a cap and trade system is to put downward pressure (that the consumer was not going to have to pay for) on utilities to go for cleaner energy over heavily polluting energy. This deal doesn't do that. In fact, because the credits that National Grid will benefit from in the deal will essentially be paid for through the 6.1 cents subsidy that the tax payers provide, we a*re in fact paying for them to get the credits* they're then are going to be able to resell. We as consumers and tax-payers *are paying for the cap and trade arrangement* which was one of the concerns with that program; the point of cap and trade was that the cost of transitioning not fall on consumers but be an economic pressure on the industry. We are paying a subsidy out of our tax dollars, we will pay for any additional costs and increased rates as rate payers for an incredibly expensive deal that does not lower the economic ceiling on gas and coal. In other words if it was cheaper per kilowatt hour for National Grid once the subsidy is taken into account to purchase the renewable energy it would then be an economic incentive for them to use that energy over gas and coal. Without that, we are in fact continuing to incentivize the dirtier forms of energy. I am deeply concerned that the hearings officer did not understand why the consumer should not be paying for these things, that it is in contradiction to the purposes of the Global

Warming Solutions Act. We have jobs, we have the cost of the energy, and of course there are solutions that would go the other direction. The deals for renewable energy should become less costly over time. We need the savings to be passed on directly to the consumer as the Global Warming Solutions Act foresaw. And of course those job-creation, savings to tax-payer and rate-payers and private utility companies footing their own bill for transitioning to renewable energy are most important in our environmental justice communities - the communities where they tend to carry more of the dirty energy burden and benefits less from parks and other healthy environmental opportunities. Which again is a priority that's listed in the Global Warming Solutions Act. The benefits of renewable energy – environmentally and economically – to consumers, workers, and regular people thus far I'm not seeing reflected in the thinking behind project like Cape Wind and some of what I have heard as exemplified by this example related to this committee.

In terms of the modeling system, I am very excited about the inclusion of this in the planning process. However, I am a strong advocate for the fact that the modeling must not only look at planning forward from the present, but it has to also look at what the long term goals of completely lifting our carbon footprint (regardless of when that happens in time) and planning backwards from that reality. If we do not look at the long term goal and work our way backward from there, we could essentially end up building a bridge to nowhere. That is if we only plan forward from the present we could in fact make a series of choices which will not lead us to the end goal in the long run. Why is this? Because we're dealing with a very complex system of interactions which at this point include not only the economic and environmental industry and community interactions but as well we have the questions of how are price increases caused by peak oil, peak coal, we believe that water in our state at this point we're using more than is being naturally replenished. When you add that plus I am again pleased to understand there's a commitment to looking at adaptation there are many factors which will provide different pulls at different times over the course of the next few decades.

Look at, for instance, the Asian Long Horn Beetle which has devastated a sizable proportion of the trees in the Worcester area (which has now been sighted in Boston). The loss of tree cover is a natural, unfortunately, outcome of global warming; and in this case the Asian Long Horn Beetle is being the vehicle of that impact. It is critically important that we understand the modeling not in a linear from the present to the future manner, but that the modeling has to actually represent these complex interactions – not just the value of our forest as carbon sink and loss of trees in building projects across the state but the multiplicative impact of losing that sink affect because as the climate changes the trees themselves weaken and become more susceptible to infestation.

This means we're really talking about needing to use a systems analysis which captures that for instance it might be faster to spend a huge amount of money and buy our way out of coal and oil based on wind energy production essentially. Ignoring the fact that if we use up our financial resources now and we have not figured a way to capture the savings from renewable energy, we end up with no money to spend in the future. I don't think there is any reason to assume that our economy is going to rebound and be even more financially productive in the next 10-15 years than it's been in the last 30 for instance. Only that the kind of significant GNP growth that would be sufficient for us to be able to afford to expend economic resources at the pace we have been expending them over the past 10-20-30 years if we think we're going to buy our way out of this mess. So what we need is an analysis that understands that we need to start at

the end goal, figure out what that looks like, and then make sure that the path that we're building from here forward is going to in fact reach that goal in the long run.

So for instance, in assessing transitional goals between now and the end goal, we need to look at whether something moves us in that direction is a temporary fix that is worth the investment even though we're going to do something to replace that fix later or whether what we're doing, for instance, might make the work later harder to accomplish.

One good example of this is that for some reason this planning process has looked at doing first the things that cost little, have very fast payback, or actually save money. That is not a good planning process because as I've said there's no reason to assume we're suddenly going to have way more money to spend later. In addition, if those theoretical actions that would save money in the short term (for instance, renewable energy sources because they have relatively fast pay back periods makes sense to focus on) are not implemented so that is in fact what they do, then this model fails. If we consider a deal for instance the one with Cape Wind that would tie a significant portion of soon to be built renewable energy into a 19 year contract that does not save us any money; then the theoretical idea that renewable energy will save us money is not useful in a concrete planning process. Such theoretical savings must have conditions written into law so that is their actual impact. So what we need is that activities that will save money in the short run need to be structured so that the people or entities who are saving that money are going to be in a position to put those savings captured in to paying for the next several rounds. So for instance, Cape Wind, if it is going to create a margin of savings (which for a for-profit corporations is usually considered profits) then it would only make sense to allow such savings if they will be plowed back into the next round of steps in our plan to diminish greenhouse gas emission - esepcially if they were not accruing to consumers which both the priority of the Global Warming Solutions Act and make sense especially in this down economy. It doesn't make sense that the savings from generating renewable energy to go to a for-profit entity that has no commitment to reinvest those savings into further renewable energy or other means of conservation in Massachusetts – especially when subsidized by the tax-payers. It would make much more sense to, for instance, build the wind mills publicly such as Hull has done where the savings come directly back to the people who are using the energy, and therefore creating a cushion, shall we say, a financial capacity to then invest in further things even if it's going back to individual households who can then afford to buy a light bulb or to do further more costly insulation.

A different example would be to prioritize co-generation. Co-generation in theory would eventually be phased out if we're doing electric generation through wind for example. Co-generation systems won't necessarily make sense if we're not creating electricity in ways that generate a lot of heat as well. But, they are an investment that has good payback for through the median time period of the time scale that the Global Warming Act looks at. Its savings will accrue directly to either the municipality, the business, or the resident who puts in a co-generation system; so whatever savings accrued will at least stay within the Massachusetts economy presumably for the time to come. Thus, if we're assessing this as a transition technology it makes sense as a place to put some money.

The other factor in this mix in terms of modeling is to look at what's effective. Oddly, in this report, (again, I talked about this in more detail at one of my testimonies at one of the hearings) and I've seen this in other environmentally related planning, that the activities that would require public buy-in and public education and, in that sense, organizing to engage large segments of the population in engaging in those

activities has been put aside; the argument is made by the folks doing the assessment and writing the report that measuring the potential effectiveness of techniques that engage the pubic, that educate the public, that organize the public is hard to do, unpredictable, and not very reliable. None of that is true. The problem is that the people who are doing the modeling do not bring the appropriate set of experience. Any community organizer who has done this work over a period of time is very good at projecting realistic assessments with appropriate strategies that will work.

We all know that a huge amount of getting our carbon footprint lifted inheritantly requires the engagement broad swaths of the public in behavior change. It doesn't even make sense to model without including that. You can't include that unless the people doing the modeling bring the appropriate expertise and that simply has to be fixed for this assessment to be realistic and for the goals to be meaningful. In fact, it must be include for the goals to take advantage of one of the greatest resources we have: the willingness of people to engage. To not count that resource into the mix is as bad as when people don't want to tax the carbon impact of things because it is a direct component of what's going on.

Not engaging the public in the process we already have evidence makes it harder to accomplish our goals. I will go back to Hull; they are the one community in the eastern seaboard that has the most wind mills per person and it's because the people of Hull were allowed to engage in the process of making the choice to build wind energy. There are numerous examples in the Berkshires, for instance, where attempts are being made to put in wind mills and there is huge resistance. This resistance is to be expected because there's been an attempt to bulldoze, run over the interests of local people in the building and in the profit making from those wind mills which will be taken out of the Berkshires, will not accrue to the local people who have to deal with the inconvenience and destruction of part of the landscape. It may seem to be a slight inconvenience in the mind of many but it is real to those who face it every day.

So it is critical in planning forward not only how to include the public because they are a resource and their participation is necessary in accomplishing the long term goals (again, this is eminently clear if you plan backward from the future) but we have evidence to show us that you must include them because without including that factor you're actually building resistance and barriers into the process moving forward. For instance it may be possible to build the first few wind mills or even a number of wind mills by overriding the local interests and it may be faster to do it without engaging the public in the dialogue or in the profits (although again, I'm going to underscore that the Global Warming Solutions Act requires that the benefits are suppose to accrue to consumers). However, what you are also doing is building resistance to future changes where you create resistance because renewable energy becomes seen as an enemy of the public. Once you've actually done that then you're actually going to make it harder to create changes down the line.

This is a critical piece of your model; it's a critical piece to creating a real plan. You've got to include the activists who've done long term community organizing, who can create appropriate models in the process.

Similarly I spoke at length about the importance of including in your model an accurate understanding of how uptake of new technology happens in a large swath of a society. There are studies that show this; it is a curve, it is not a linear progression. It is not a straight line that's incremental. The technology is first picked up by the technology risk takers, the folks who are willing to try a new technology. Much like the way that Toyota did not try and broadly advertise hybrid cars; they did it by reaching a very special

audience of those who were prepared to buy hybrid cars and actually including in their marketing plan an understanding of how those people would then educate the people around them who are not necessarily the biggest technology risk takers but are close to the lowest hanging food; they would be the next layer of people to pick things up. Without going thru the model in detail of how people pick up technology as I did in verbal testimony at an earlier hearing, the point is that it starts slow, it builds from a small group outward, and then at some point you get critical mass and the up take goes very quickly. Part of what this means, for instance, in planning subsidizing for technological up take in the public we cannot start with subsidies that won't get used but by a few people at the beginning when we're going to end up in trouble where take off hits and we need tons of subsidy and no longer have the money to fund it. So again, you need a planning backwards process and a systemic analysis to understand how to plan financially for the up take process, which as I said is a curve. The implication is you have to plan structures like revolving loan funds since these technologies pay for themselves over time and other financing processes that capture savings to fund further steps later. All of these examples add up to pieces I think you need to add to your model – it has to include the end goal and planning backwards and it has to incorporate systems theory style elements and the expertise of those in areas such as public education, organizing and engagement.

You've got to prioritize local production. There are studies that show that renewable energy is most economical and compatible with more local and smaller production units, for instance, solar panels on the tops of roofs of houses, the replacements of appliances, the shift over to passive solar heating of water, even residential size wind mills, the choice to keep tree cover over a building which saves a great deal of energy, the building of rooftop gardens. These are actually micro size changes in a state as large as Massachusetts but the energy that is produced where it's going to be used is the most efficient energy we can get. Separate from the cost savings and who gets to benefit from the cost savings, the transmission of electricity is a very wasteful process. It makes more sense to produce electricity where it is going to be used. So ideally when we look at the long-term vision of a society that has lifted its carbon footprint, most energy production is probably going to be very small and very local. I do not see this reality reflected in the model: an understanding that energy transmission doesn't make sense, that it's expensive, and that it is decentralized, local, small and locally controlled development that is most compatible with most renewable energy sources. There's a model paradigm shift that needs to be reflected in the way that this modeling is done here; this understanding needs to be reflected in the way that both appraising the cost and the functional implementation is going to happen.

There are a lot of specific things I could address that I'm concerned about. For instance, the discussion of transportation does not reflect the best practices understanding of moving over to public transportation. A real genuine cost benefit analysis would first acknowledge that we subsidize private cars and roadways and gas use in vehicles in numerous ways from federal subsidies similar to the huge costs that they're asking of the states and the residents of the states to carry if we really do move to a national grid of high transmission energy wires. We've been for decades subsidizing the gas industry for our cars so if we're going to look at shifting over to public transportation which makes by far the most sense, we need to factor those subsidies in. And in addition, cars cost people on average $8k a year to maintain; with that $8k cost per household if we were going to have a consumer benefit that would be a huge jump start to our economy obviously replacing people's dependence on cars would be huge. Separate from the carbon benefit, the economic benefit would be a sea change. I would hope that reflected in this modeling would be an understanding that the way you build transportation effectively is not by going after the people who

are least likely to use it (which has been the policy assumption of the last several years – the model that we somehow want people out of SUVs and Humvees); that's not where it's going to start. Public transportation is driven by ridership concerns. Rather than starting with focus on theoretical global warming alone and the vehicles that we now use, we need to escape the fallacy of planning forward; we need to go the other direction and look at what would the long term model of transportation be? I assume that the long term model would be a combination of large transportation vehicles for public transport of large number of people. Obviously smart growth principles which are addressed well in the models; but also the greater use of bicycles and potentially returning to trolleys and electric cable, gondola-styles of transportation which if they can be electrified would already be much less polluting than what we have now; these represent a future that is potentially sustainable long term which, of course, our use of private cars is not. Again, the modeling needs to work backwards from shared bicycle systems, shared car systems, mostly dependent on public transportation that is probably electrified; then figure out what moves us from here to there. Simply improving the fleets of municipalities and potentially regular people doesn't solve our dependence on oil. Nor cut down on our dependence on asphalt, for instance, which is hugely costly and is increasing the cost per linear foot of repairing our roadway significantly as the cost of petroleum rises; those costs are only going to continue to rise. It makes our unaltered rebuilding of the existing infrastructure expensive, increasingly expensive and in fact will need to be phased out at some point. This is one of these places where we need to look at the question of what's the long term goal and what is the transitional system from here to there. The extent to which we have stimulus money for rebuilding infrastructure, we should be consciously rebuilding infrastructure while incorporating elements that will move us over to the longer term transportation models that are our predictable future.

Similarly when we look at replacement of our electricity production system not only the question of very local units locally controlled where the financial benefit goes back to local people, local businesses, local municipalities, we also need to acknowledges that we are already pretty close to having all the technology we need. If we could wave a magic wand we could be at close to 100% renewable right now which means that the barriers are not technological they're political and financial. Addressing those problems needs to include what are the political and financial barriers.

Again, if the transitional choices we make accrue money to the largest financial interests in the electricity and transportation fields we know from experience that our long term environmental interests as regular people, as residents will suffer. Look at the oil spill right now in the Gulf; Brazil and Norway had required shut off valves that if they had been in place would have saved us from the BP oil spill. The only reason that the United States does not have such shut off valves required in federal law is because of the power of the lobbying dollars and influence of the oil industry and the oil production part of that industry. If our state dollars are used to feed the largest economic interests that are use to making a profit off of energy in the coming years in our attempt to move over to renewable energy, we are again building the resistance to future changes down the line that are going to move us off those industries are the large sort of the big version of those industries completely. I understand the commitment to sort of share equal impact that's described in the Global Warming Solutions Act but we need to be honest about what helps us create change and what doesn't help us create change. Our state dollars are either going to be used to facilitate long term change or not. To accomplish that, we must put the financial resources in the pockets to those who are going to stay in this state, are going to be committed to our renewable energy future, so we have the resources long term to do that; that means financial, environmental and job benefits being done at the people level, at the neighborhood level, at the municipal level. Or we build in barriers to long-

term change for short term success. A systemic analysis and planning backward can save us from steps that feeding these unnecessary conflicting forces.

If we prioritize weatherization and conservation with a priority on engaging the public now and instituting the methods that will more quickly be able to draw on the interest and commitment of our residents, we have to ask whether need new power plants based on polluting fuels at all. If we build any at all, we must require as basics the best industry stands – such as air-cooled plants which cost minimally more but significantly decrease impacts on water and heating. Licensing and siting must consider if we are continuing to incentivise large facilities over small, outside-investor controlled or locally controlled, and whether profits and savings accrue to the local community and our state or continue the trend of sending those dollars out of state and out of reach of funding our renewable future.

Finally, the Global Warming Solutions Act does discuss the question of adaptation. I could not get a lot of details on what adaptation factors the commission is looking at. I wanted to name that we know not only the examples of houses falling into the water because of rising water levels, but I do think we have to look at things like green cover. Our forests are emphasized as a carbon sink in the materials, but we are not looking at the issue of our trees, their health already being endangered, and what the impact of infestations like Asian Long Horn Beetle when the natural resistance of our forest has been weakened by global warming.

I do not see any discussion of the need to address the lost of wetlands, the reopening of barriers between wetlands and our river ways in the state. Again, the economic impact of not addressing the natural safety valve effect of wetlands along riverways when large rain incidents are predictable and addressing and planning for them seems a clear mistake.

I do not see a discussion of the need to adapt our zoning laws and our statewide priorities so that local environmental concerns are written into law and respected. We have both 40B and now the very disturbing development, in fact proposed by the administration, to override local environmental zoning if a company wants to come in and build wind mills. This is in direct contradiction. It does not show an overall understanding of this issue in terms of the responsibility to model holistically as described and required by the Global Warming Solutions Act and again represents this sort of short term gain creating long term resistance problem that the modeling for it to be effective cannot fall into.

There are health impacts that are going to be more and more noticeable from global warming. People talk about the impact of heat waves on health but there will also be an increase in allergens (well documented), an increase in other health impacts like the increase in malaria that is moving farther and farther north from the equator because of both the migration of the kinds of mosquitoes but also the wetness of our environment as our environment shifts. These health concerns mean that a real model's going to have to start addressing the question of how we increase prevention and early intervention in our health system and genuinely adopt a system of controlled costs.

Peak water is a serious concern. It must be in at least the adaptation side of this modeling. Along with mitigating the impact of global warming must come a decrease in toxic chemicals, and an end to chemical treatment of lawns, etc. that dangerously and unnecessarily increase phosphates and nitrogen in our

waterways. Environmental zoning considerations of huge developments in areas of our state where riverways are already over-taxed and not replenishing their water levels naturally. And how do you plan in for the toxic impact on our coastline, fisheries and tourism if and when toxic petroleum reaches our shares on the gulf stream as predicted in environmental modeling on the long-term impact of the BP spill?

I've covered the issue of green canopy, wetlands, and health. I think building code that needs to address the question of north facing and south facing and I had specifically attached to this testimony our petition which I'm sure we will have more signatures on but that mention specific existing initiatives out there that I hope will be part of the commission: net-zero new building legislation and a commitment of resources to the people level of addressing this crisis because we cannot simply short cut the need to engage the public in a process of a societal shift and transition. It can't be avoided and to avoid it is only to create barriers later.

Thank you very much for your time. I imagine there may be other details that I will append to this, but I appreciate your reviewing this information and I remain available to provide you with the statistical and basis and studies to underpin the conclusions that I offer here in commentary on the Global Warming Solutions Act hearings.

Thank you very much for your time, this is Grace C. Ross available at grace@graceross.net. or I can be called at 774-271-7677. I remain committed to being willing to participate in the commission's process and bring the expertise as somebody who has not only policy background but has done community organizing and brings lots of expertise in those models as well as the issue of the up take of technology and systems analysis.

Thank you for your time.

Submitted this July 15th, 2010

Emily Russell-Roy, The Pacific Forest Trust

THE PACIFIC FOREST TRUST
Our Private Forests are Our Public Treasures.

June 17, 2010

Lee Dillard Adams
Mass DEP
One Winter Street, 6th Floor
Boston, MA 02108

Submitted via email to: climate.strategies@state.ma.us

Re: Including Forests in the Massachusetts Global Warming Solutions Act Dear

Ms. Adams:

The Pacific Forest Trust (PFT) appreciates the opportunity to submit written testimony regarding the 2020 reduction target and measures to achieve that target under the Global Warming Solutions Act (GWSA). PFT is dedicated to sustaining private forests for all their public benefits. For over 15 years we have been working to promote the climate benefits of forest conservation and stewardship, and have led the development and implementation of forest and climate policies at the state, regional and national levels.

PFT would like to commend Massachusetts for its leadership in passing and implementing the GWSA. However, one of the most important, cost-effective and readily available climate solutions we have in Massachusetts is conspicuously absent from the draft Implementation Plan: *our forests*. We encourage the Commonwealth to set ambitious GHG reduction goals, and to recognize the important role that forests can play as part of the Commonwealth's climate strategy.

Recommendations

1) Set the 2020 GHG reduction target at 25%, if not higher

In light of the serious threat that climate change poses to the environment, economy and citizens of the Commonwealth, it is essential that Massachusetts take bold and immediate action. Some climate change impacts are already being felt, especially on our natural resources. Forests around the country

are facing new and exacerbating stressors, including drought, wildfire, pests and pathogens. The Stern Review showed that acting early and ambitiously to address climate change will yield long-term benefits that far outweigh short-term costs.[1] Massachusetts is already well on its way toward achieving cost-effective climate solutions. However, the state must continue to act boldly by setting the most ambitious GHG reduction targets possible.

2) Include forests as a GHG reduction measure within the Implementation Plan

Forests actively remove carbon dioxide (CO2) from the air as they grow, and offset approximately 10% of the state's GHG emissions annually. [2] Forests also provide critical natural infrastructure needed to help society adapt to a changing climate.

According to the 1990 GHG inventory, forests sequestered approximately 8.6 million tons of CO2 per year, but resulted in emissions of up to 2.2 million tons of CO2 per year from land conversion.[3] Although the rate of conversion has slowed since 1990, forest loss to development and other land uses continues to erode the state's carbon sequestration capacity. At a time when we must find low-cost ways to reduce GHG emissions and achieve multiple co-benefits, we need our forests more than ever before.

The most direct and effective way to maintain this significant carbon sequestration capacity is by reducing and mitigating forest loss to development. The revised GHG Policy under the Massachusetts Environmental Policy Act recognizes this need by requiring developments that impact 50 acres or more to evaluate and mitigate for the emissions associated with forest loss.[4] While this is an important first step, it will unfortunately not capture the vast majority of forest conversions in the Commonwealth, most of which are smaller than 50 acres. The Implementation Plan under the

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1 Nicholas Stern. 2007. *The economics of climate change: the Stern review*. http://webarchive.nationalarchives.gov.uk/+/http://www.hm-treasury.gov.uk/d/ExecutiveSummary.pdf.

2 Massachusetts Department of Environmental Protection. 2009. *Final 1990 Baseline and 2020 Business as Usual (BAU) Projection*. http://www.mass.gov/dep/air/climate/1990_2020_final.pdf.

3 Ibid.

4 Massachusetts Executive Office of Energy and Environmental Affairs. 2010. *Summary of the Final Revisions to the MEPA Greenhouse Gas Emissions Policy and Protocol*. http://www.env.state.ma.us/mepa/downloads/GHG%20Policy%20FINAL.pdf.

GWSA can help address this loophole by establishing a strong and compelling vision for protecting forests and maintaining their critical carbon sequestration capacity.

The Climate Protection and Green Economy Advisory Committee's Subcommittee on Forests, Agriculture, Marine, and Land Use Change has already reviewed opportunities to reduce emissions in the forest sector. They have found that achieving "no net loss" of forests and their climate benefits by 2020 could result in GHG reductions between 2 and 6 million tons annually.[5] In addition, maintaining forests also preserves their ability to sequester CO2 into the future, thereby establishing a foundation for achieving the state's more ambitious 2050 target of an 80% reduction in GHG emissions.

This "no net loss" goal could be accomplished through: 1) Requirements to account for the impacts of forest loss to developments of less than 50 acres; 2) Complementary smart growth strategies to reduce forest loss and encourage community-oriented development; 3) New economic incentives to keep forest as forest; and 4) Statewide monitoring to track the effectiveness of forest-climate policies.

Because the majority of Massachusetts is forested, we have a unique opportunity here in the Commonwealth to harness the carbon sequestration capacity of our forests to

reduce GHG emissions and help meet our climate targets. In addition to carbon sequestration and storage, forests provide a wealth of other co-benefits to the citizens of the Commonwealth, such as clean and abundant fresh water, wildlife habitat, wood products (inclusive of renewable energy), recreation and tourism, and quality of life.

We must recognize the value of forests and maintain them, not only as a critical solution to our climate challenge, but also as a vital component of our economy and our society.

Conclusion

Intact, healthy forests are one of the most important, but least recognized climate solutions we have in Massachusetts. They will also be significantly impacted by climate change unless we act swiftly and boldly. We urge the state to set a 2020 reduction target of 25% or greater, and include forests in the final Implementation Plan.

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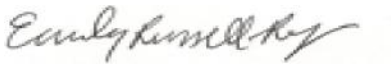
[5] GWSA Forests, Agriculture, Marine and Land Use Change Subcommittee. 2010. *Initial Recommendations for Significant Carbon Reductions.* http://www.mass.gov/dep/public/committee/fapres.pdf.

Thank you for the opportunity to provide input on the implementation of the GWSA. We commend the Commonwealth's leadership on this issue, and appreciate its effort to consider the input of stakeholders and the public. If you have any questions, please do not hesitate to contact us. We look forward to continuing to work with you.

Sincerely,



Emily Russell-Roy
Policy Project Manager
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erussellroy@pacificforest.org
http://www.pacificforest.org

July 15, 2010

Andrew Schuyler, New Fuels Alliance

Laurie Burt
Commissioner
Massachusetts Department of Environmental Protection
One Winter Street,
Boston, MA 02108

Submitted via electronic mail to: climate.strategies@state.ma.us

RE: Draft Climate Implementation Plan (Chapter 298, Acts of

2008) Dear Commissioner Burt,

The New Fuels Alliance (NFA) appreciates the opportunity to provide written comments to the Massachusetts Department of Environmental Protection regarding the draft climate implementation plan as it relates to the 2008 Global Warming Solutions Act (GWSA). Specifically, the comments below address the treatment of biomass and the proposed 11-state Northeast/Mid-Atlantic Low Carbon Fuel Standard (LCFS) that will likely be used as a compliance mechanism for the GWSA.

NFA is a not-for-profit organization that educates political leaders, regulators, public interest groups, businesses, and the general public about the environmental, economic, and other benefits of non-petroleum fuel production and use. Its organizational purpose is to bring together the wide range of groups and sectors that are stakeholders in the development of advanced, non-petroleum fuels to build a broad and diverse base of support for a more sustainable energy future in the United States. NFA works closely with leading researchers and developers of advanced biofuels to support strategies and policies that will provide meaningful fuel diversification solutions.

A. NFA Supports GWSA's Greenhouse Gas Reductions and Clean Energy Development

NFA strongly supports the goals outlined in the 2008 GWSA of reducing greenhouse gas emissions (GHG) and supporting in-state clean energy development. As an organization that works closely with advanced biofuel researchers, producers, investors and other stakeholders, NFA understands the importance of the development and implementation of policies that are designed to spur clean fuel innovations. The advanced biofuel sector is positioned to reduce petroleum dependence, provide carbon reductions in transportation and heating fuel, and stimulate economic development across the Commonwealth.

The clean tech sector requires carbon-based fuel policies and regulations that are durable enough to support long-term investments. To this end, NFA believes that the LCFS, if drafted

and implemented with a balanced approach, holds great potential to further reduce petroleum demand and mitigate climate change, while helping to build a critical piece of the clean tech industry. Similarly, NFA believes that biomass has an important role to play in Massachusetts by reducing fossil fuel use and subsequent carbon emissions.

B. Commonwealth Should Reconsider Shift on Biomass Position

On July 7, 2010 the Massachusetts Executive Office of Energy and Environmental Affairs (EEA) announced its intentions to significantly limit the use of biomass under the Renewable Portfolio Standard (RPS). This decision was based solely on the recently published report by the Manomet Center for Conservation Sciences *(Biomass Sustainability and Carbon Policy Study*).[1] It is troublesome that EEA made this decision prior to an agency deadline (July 9, 2010) for accepting public comment on the Manomet study. It is also concerning that EEA has not proposed a peer-review of the Manomet study, particularly when considering the influence that the report is having on altering renewable energy policy in the Commonwealth.

It is important to note that the Manomet study itself is extremely controversial because of the modeling and assumptions that were used. NFA encourages DEP and EEA to examine the public comment on this matter and to work with stakeholders to better understand the breadth of unresolved issues that directly relate to carbon accounting and the 2008 GWSA.[2] While there are several problems associated with the study, it is worth highlighting a few key issues:

- The study does not consider non-forested sources of wood. This essentially means that the fuel, or wood, that the biomass industry predominantly uses is not considered by the study, and as such, fails to accurately demonstrate the carbon profile of biomass electric generation.
- The study uses a stand-level carbon accounting metric, as opposed to a more realistic landscape-level approach. In its most basic form, the use of stand-level accounting overstates short-term GHG emissions and understates GHG reductions that result from biomass energy. A more realistic approach would include a broader supply area, as is common practice in the industry. This larger scale, or landscape, analysis would consider all stands in a given supply area and would show that the effects of biomass harvesting on carbon stocks depend on the actual rates of re-growth across the larger system, or landscape. By contrast, the stand-level approach creates the false impression that carbon stocks are lost through harvest and that this reduction is only reversed through the re-growth of the biomass over a set period of time on a set plot of land. This oversimplification ignores what is actually happening in practice and the key carbon uptakes that are occurring on the landscape scale from which the biomass was initially harvested.

[1] http://www.mass.gov/?pageID=eoeeaterminal&L=4&L0=Home&L1=Energy%2c+Utilities+%26+Clean+Technologies&L2=Renewable+Energy&L3=Biomass&sid=Eoeea&b=terminalcontent&f=doerarrabscps&csid=Eoeea

[2] www.mass.gov/energy/biomass NOTE: comments are expected to be posted by July 16, 2010

Since EEA is proposing a major policy shift on a single study, NFA strongly urges regulators to conduct a transparent, peer-review of the Manomet biomass study prior to the development of any regulations related to the treatment of biomass in Massachusetts. NFA also recommends that EEA consider the best available science and to broaden its approach to biomass and its relation to the 2008 GWSA and RPS.

C. California/NESCAUM Approach to LCFS Results in Asymmetrical Carbon Accounting

As you know, the Northeast States for Coordinated Air Use Management (NESCAUM) is acting as a coordinator of the regional LCFS. While NESCAUM has no rulemaking authority, it is leading the effort to develop a model rule that it will encourage all participating states to adopt. NFA and numerous stakeholders are concerned that NESCAUM intends to follow the California LCFS model, particularly as it relates to the treatment of indirect effects as part of lifecycle assessments (LCA).

It is critical to recall that the traditional way of determining the carbon score of a fuel is to examine the supply chain and then add up all emissions associated with producing and using the particular fuel. This includes all upstream emissions, like oil extraction for petroleum, land conversion for biofuel, or steel production for wind (electricity). The cumulative "well to wheels" or "cradle to grave" score is the fuel's full lifecycle carbon score. Also known as "direct" or "attributional" carbon emissions, this methodology was to be the foundation of the LCFS. Unfortunately, the California Air Resources Board (CARB) adopted a controversial policy last year that expands the system boundaries only for biofuels, putting this ultra low carbon option at a significant disadvantage.

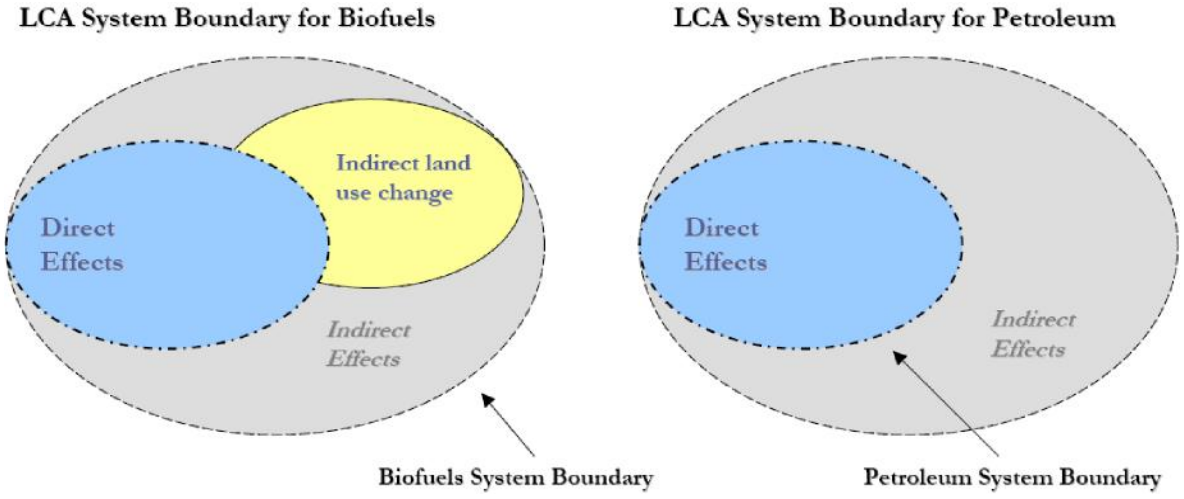
NFA has actively participated in the rulemaking for the California Low Carbon Fuel Standard, and the U.S. Environmental Protection Agency's (EPA) Renewable Fuel Standard Program (RFS2). While these polices differ in legal and regulatory aspects, they have both demonstrated a propensity to develop asymmetrical and/or overly uncertain carbon accounting methods and inconsistent LCA system boundaries. An important difference between the policies is that Congress required EPA to consider the indirect effects associated with biofuels, while CARB was under no such legislative mandate. As you can imagine, it is particularly troubling for the advanced biofuel industry to be penalized for both direct and indirect effects in a LFCS regulation that purports to treat all fuels equitably, while its competitors, including petroleum, are only debited for direct GHG effects. It is important to note that like California, the regional LCFS is not under any legal requirement to include specific LCA parameters in its policy.

As noted, NESCAUM and the participating states have stated on the record that they intend to use the California LCFS as a template for the regional LCFS. Specifically, in October 2009, Massachusetts regulators and NESCAUM outlined a plan for moving forward with the LCFS,

largely with guidance from California.[3] Furthermore, 11 governors signed a non-binding Memorandum of Understanding (MOU) on December 30, 2009 that includes language supporting the inclusion of an analysis of indirect land use change (iLUC).[4]

NFA encourages DEP, NESCAUM and other vested entities to understand that any comparison or analysis of biofuel with petroleum and other fuels must be conducted in a manner that ensures parity of system boundaries. As discussed, the recent trend in rulemaking is to use unbalanced carbon accounting methodologies that do not require petroleum to undergo the same indirect GHG analysis as biofuel. NFA urges Massachusetts regulators and policymakers to avoid this type of a regime, and indeed lead an effort to fairly and accurately measure the direct and indirect GHG effects of all fuels, including petroleum and other fossil fuels. If regulators are not able to fully capture the full lifecycle effects of all participating and baseline fuels, the regional LCFS should utilize a GHG measurement regime that equally assesses the same type of impacts for all fuels.

NFA presented similar concerns related to biased carbon accounting at an EPA RFS2 workshop in June 2009. The presentation noted that EPA considers only one indirect effect (i.e. iLUC) for one fuel (biofuel). In addition, EPA did not consider other indirect effects for biofuels. The result is an asymmetrical comparison between biofuels and petroleum with the fundamental system boundary problems and consideration of only one indirect effect:



D. Advanced Biofuel Companies, Leading Scientists and Stakeholders Support Balanced Approach to GHG Analysis

Massachusetts is host to some of the world's leading research and development of advanced biofuels. Numerous advanced biofuel companies and clean tech investors are currently doing

[3] http://www.nescaum.org/documents/northeast-and-mid-atlantic-states-regional-low-carbon-fuel-standardstakeholder-meeting-boston/seidman-lcfs-stakeholders-10-09-nls.ppt
[4] http://www.nescaum.org/documents/lcfs-mou-govs-final.pdf/

business in the state, and will play a critical role in helping regulators achieve their objectives of the 2008 GWSA by substantially reducing the carbon profile of liquid transportation fuels. Accordingly, NFA encourages regulators and policymakers to consider the positions articulated by this clean tech industry as it relates to future research and market growth opportunities. More specifically, the advanced biofuel industry has repeatedly stated that the selective enforcement of indirect effects against only biofuels will be detrimental to this emerging industry, which relies on objective policies and level playing fields to survive in a carbon- controlled economy.

It is important to understand that after it became clear that the California LCFS planned to selectively penalize biofuels for an additional category of carbon emissions (indirect effects), several stakeholder groups objected. For example, in October 2008 NFA and more than 25 advanced biofuel companies, researchers and investors submitted a letter to California cautioning against the selective enforcement of indirect carbon emissions against biofuels only. In March 2009, more than 110 scientists (including members of the National Academy of Sciences) submitted a letter to Governor Arnold Schwarzenegger raising concerns about the scientific uncertainties associated with predicting indirect carbon emissions (including iLUC), and detailing how selective enforcement of these uncertain emissions would create a bias in the California LCFS. Also in March 2009, the Truman National Security Project voiced its unease with the CA approach to carbon accounting. Several environmental groups and academics have also submitted letters to Governor Schwarzenegger opposing selective enforcement of indirect effects.[5]

As discussed, the 11 regional Governors signed an MOU last December that supports asymmetrical carbon accounting. This occurred despite the fact that on November 17, 2009 more than two dozen biofuel executives wrote to the 11 regional governors detailing the bias in the California regulation and asking for an explicit commitment to equitable treatment of system boundaries.[6] Similarly, numerous leaders in the advanced biofuel industry have indicated their concerns with the regional program in the context of public meetings, conferences and other settings.

Recently, the Agricultural and Resource Economics Department at UC-Berkeley published an article that addresses the inclusion of iLUC in regulations impacting biofuel production and use.[7] The article concludes that penalizing biofuels for iLUC: (1) contradicts a basic principle of regulation by holding a regulated party accountable for actions well outside of their control; (2) may be irresponsible given that the land use impacts depend on so many variables and cannot be predicted with precision; (3) is inconsistent because so many other indirect effects are ignored by current regulations; and, (4) may have the perverse result of undercutting advanced biofuel investment.

[5] A partial list of public statements opposing selective enforcement of carbon effects is available at: http://www.newfuelsalliance.org/LCFS%20Public%20Record%20Summary.pdf

[6] http://www.newfuelsalliance.org/LCFSMOUGovernors%20Ltr.pdf

[7] http://www.agecon.ucdavis.edu/extension/update/articles/v13n41.pdf, April 2010

E. Conclusion

NFA supports DEP in its goals of providing meaningful GHG reductive energy solutions for Massachusetts residents and businesses, all the while developing a robust clean tech industry. To be clear, NFA also supports the concept of holding all fuels accountable for their carbon emissions. Further, NFA is not interested in shielding any fuel from being penalized for lifecycle carbon emissions associated with their production and use. However, the definition of lifecycle must be the same for all fuels, especially if the fuels are compared to one another in a relative case. Additionally, the use of the best available science is critical for establishing durable policies and achieving meaningful carbon reductions. To that end, NFA again urges EEA to quickly initiate a peer-review of the Manomet biomass study.

Beyond the 2008 GWSA, requiring significant reductions in the carbon intensity of fuels should be a priority for the Northeast/Mid-Atlantic region, and the LCFS has the potential to help accomplish this critical goal. Indeed, the vision of the LCFS, which was to debit all fuels for their supply chain carbon emissions, was widely supported by the advanced biofuel sector. However, this support has diminished because the carbon accounting metrics currently employed are inconsistent across the various fuel pathways. The regional LCFS, used in conjunction with the 2008 GWSA, would regain the support of the advanced biofuel sector if policymakers were to commit to taking a fresh, balanced approach to carbon accounting.

Thank you for your time and consideration of these issues. Please do not hesitate to contact us with any questions.

Sincerely,

Andrew Schuyler
Director, Northeast Region
New Fuels Alliance

Allison Smith, Anbaric Transmission

From: Allison Smith <asmith@anbaricpower.com>

To: "Strategies, Climate (DEP)" <Climate.Strategies@state.ma.us>

Date: 7/15/2010 1:31 PM

Dear Ms. Adams,

The Draft Climate Implementation Plan to reduce greenhouse gases focuses on three areas of implementation: transportation, buildings, and energy supply. To address the goal to reduce GHGs from energy supply the plan recommends requiring distribution utilities to purchase renewable energy and increasing transmission to import low-carbon electricity from Canadian resources. We believe there should be more emphasis on accessing regional renewable resources as a means to fulfill the RPS and stimulate economic development in the region.

Anbaric Transmission is an independent developer of electric transmission projects out of Wakefield, MA. Our projects focus on integrating renewable resources in New England. Massachusetts can access renewable resources within the region and also stimulate economic growth. Anbaric Transmission is developing two projects that will do just that: the Green Line, an underwater HVDC cable that could transfer up to 800 MW of wind power from Maine and the Champlain Wind Link, an underwater cable to access New York wind resources. These projects alone represent over 1400 MW of carbon free renewable energy within the region.

Attached is a short whitepaper outlining a plan to fully develop New England's renewable resource potential. The plan includes three phases of development: 1) Terrestrial wind, 2) Near-shore wind, and 3) Deepwater offshore wind resources. A strategy that pursues these resources will help Massachusetts reach its renewable portfolio targets incrementally, and grow a regional renewable resource economy for terrestrial and offshore wind energy.

We believe that Massachusetts can reach its Renewable Portfolio Standard and greenhouse gas reduction goals with resources close to home that stimulate economic development in and among local companies and communities. The Draft Implementation Plan should clearly state an effort to reduce greenhouse gases through development of renewable energy within New England first before accessing distant Canadian resources that will not provide jobs and economic development here in New England.

Sincerely,

Allison Smith
Anbaric Transmission
401 Edgewater Place, Suite 650
Wakefield, MA 01880
781-683-0706
asmith@anbaricpower.com

Attachment: http://www.anbarictransmission.com/wp-content/uploads/2009/03/meeting-new-england-renewables-targets-june-2010.pdf

Stephen B. Smith, Verallia

verallia

July 15, 2010

Ms. Lee Dillard Adams
Massachusetts Department of
Environmental Protection
Bureau of Waste Prevention
One Winter Street
6th Floor
Boston, MA 02108

Re: **Commonwealth of Massachusetts Draft Climate Implementation Plan**

Dear Ms. Adams,

Purpose

Our purpose in writing today is to provide comment on the Draft Climate Implementation Plan presented by MassDEP pursuant to the 2008 Global Warming Solutions Act.

In reviewing the documents posted for comment, we note that MassDEP is seeking comment specifically on the 2020 GHG reduction goal and where the goals should be set between an 18% to 25% reduction from the 1990 baseline. We note also that MassDEP's consultant, Eastern Research Group ("ERG") has estimated that a 19% reduction in GHG emissions from the 1990 baseline will be achieved by 2020 with implementation of measures already on the books and that with modest additional measures which are cost effective (i.e., annual cost savings exceed annual cost expenditures) up to a 35% reduction in annual GHG emissions is achievable by 2020,

Background

Saint-Gobain Containers, Inc. operates the only glass container manufacturing plant in Massachusetts. It is located in Milford and is now operating under the new brand name "Verallia". There are several other Saint-Gobain North America businesses operating in Massachusetts and we understand they will be submitting their comments consistent with their own industrial circumstances.

Our Milford plant employs 206 skilled workers and manufactures approximately 800 million glass bottles for the New England bottling industry each year. Verallia is committed to protecting its employees' health and safety, and to preserving and protecting the environment.

Like most companies operating in this area of the country, Verallia has been impacted by the high cost of energy during the recent recession. Our operations require significant amounts of energy to melt sand and other raw materials to make glass for our glass container manufacturing process. The glass container industry has been recognized in national debates about Climate Change as an "energy intensive, trade exposed" high risk industry, facing threats from alternative packaging material manufacturers as well as from imported containers.

Our Milford plant is more energy efficient as compared with the dozen other plants the company operates nationally, due in large part to the consistent availability of high quality cutlet (crushed, recycled glass containers) in the Commonwealth. Cutlet takes less energy to melt than does sand and does not emit CO2 as do some of our other raw material ingredients, such as limestone. MassDEP can take some credit for the availability of cutlet in the Commonwealth due to the bottle bill administered by your agency.

As a result of our efforts over the years to align our operations in Milford with the opportunity for increased cutlet usage and the other energy reduction initiatives undertaken at our Milford plant, we are proud that we have already reduced annual GHG emissions by over 15% in that time frame. Unfortunately those efforts mean that there is no "low hanging fruit" left in terms of energy efficiency at our Milford plant. Further, there is currently no "bolt on" emission control device(s) to further control GHG as there is for other emissions such as NOx, SOx and PM.

Comments

Given the general decline in manufacturing activities in the Commonwealth over the past two decades (as evidenced by the loss of more than 180,000 manufacturing jobs*), the potential reductions in GHG emissions from energy efficiency as estimated by ERG are 0.3 million tons of CO2e per year from industrial fuel efficiency measures. This would equate to a 0.3% reduction from the total 1990 baseline.

To the extent that such energy-efficiency-related emission reductions truly have a short-term cost payback, it is likely that prudent industrial operators will undertake such investments without any regulatory compulsion. In addition, further reductions from the industrial sector are not needed to achieve significant Commonwealth-wide GHG emission reductions by 2020 according to the ERG report. Thus, while we have no specific recommendation on a target for GHG reduction by 2020, we believe that a baseline of between 19% and 25% can be achieved without imposing any additional cost burden on our Milford plant, provided sufficient high quality cutlet remains available.

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* See Massachusetts Manufacturing Chartbook, April 2008, page 18.

Finally, it must be emphasized that Verallia favors a national solution to climate change, primarily because of the recognition that climate change is a global phenomenon, not a local one, and that a national solution is necessary to prevent leakage between states and to assure fair treatment for manufacturers wherever their facilities may be located. As such, we urge Massachusetts to not adopt regulatory mandates at this stage of its implementation plan without giving fair consideration as to how those mandates will fit in the context of an anticipated federal solution.

We would be happy to speak with you regarding this subject at your convenience.

Sincerely,

Steven B. Smith

V.P. Environmental and Regulatory
Affairs Verallia

Saint-Gobain Containers

cc: Stephen A. Segebarth

Frank I. Smizik, State Representative

The Commonwealth of Massachusetts

House of Representatives

State House, Boston, 02133-1054

FRANK I. SMIZIK
STATE
REPRESENTATIVE
15th NORFOLK
DISTRICT

CHAIRMAN

HOUSE COMMITTEE
ON GLOBAL
WARMING

Room 274, State House
TEL. (617) 722-2676
Rep.FrankSmizik@hou.state.ma.us

June 15, 2010

Massachusetts Department of
Environmental Protection
Bureau of Waste Prevention
One Winter Street 6th Floor
Boston, MA 02108

Attn: Lee Dillard Adams climate.strategies@state.ma.us

Re: Comments - Commonwealth of Massachusetts Draft Climate Implementation Plan

Dear Ms. Adams;

I am writing to provide comments on the "Draft Climate Implementation Plan" and "Cost Effective Greenhouse Gas Mitigation in Massachusetts: An Analysis of 2020 Potential." I am pleased EOEEA and MassDEP are taking the appropriate measures to implement this legislation.

I am also pleased that the implementation process is moving forward with goals and a framework for reducing emissions for each industry. This draft is a great starting point, but I would like to offer a few comments for your consideration.

Using and promoting the clean energy sector is not only necessary for our climate, it is necessary for our economy. As the clean energy sector grows rapidly around the world, we should prioritize producing clean energy and the associated technologies in Massachusetts. While we should take some wind or hydropower from Canada, investing now in our own industries not only pushes our economy back into recovery but encourages more growth in the

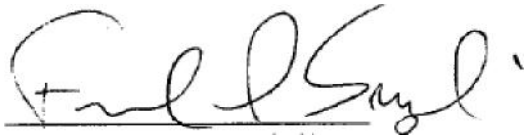
Massachusetts clean energy industry. We should invest our existing Massachusetts companies to develop more sustainable and cleaner practices in state, as well as incentivize new clean energy companies to create and to build their businesses in Massachusetts. Additionally, the Climate Implementation Plan should ensure that the Renewable Portfolio Standard for electricity requires vendors to reduce the amount of fossil fuel-based energy equivalent to the increase in the use of renewable energy sources.

In the transportation area, I would recommend greater emphasis not only on passenger rail but on increasing and improving our freight rail system. This includes more rail and connecting the rail to our ports such as Boston Harbor or nearby; the south shore and Buzzards Bay; and the North Shore.

The plan does a great job of identifying areas of potential emissions reduction within each industry, but I encourage you to be more specific in your emissions reductions strategies. The draft plan lacks tangible explanation of how such emissions reduction opportunities would be achieved or enforced, especially when such opportunities require changing human behavior. I would like to know if you have specific plans for further regulation and enforcement plans for reducing emissions in each industry you mention or if the legislature can be of assistance with further legislation. I would suggest that the specificity and breadth of the Ocean Management Plan is a good model for the final Climate Implementation Plan.

Furthermore, while I very much appreciate that grabbing the low-cost, "low-hanging fruit" methods of reducing emissions is a great start to the plan, but I emphasize the word "start." While the cost-effective measures addressed in the draft plan have the potential to reduce our emissions by 35% by 2020, as the plan states, we still have a long way to go before we reach the 2050 target of 80% emissions reductions below 1990. I therefore encourage you to start now actively working towards the longer-term goal by implementing some of the more aggressive emissions reductions strategies, even if they are slightly more expensive. I also encourage you to set the 2020 goal at no less than 25 percent so we will be on the right path towards achieving the 2050 goal.

Thank you for the opportunity to comment. I continue to be very supportive of your efforts to reduce GHG emissions in the Commonwealth. I look forward to the evolution of these documents and the further development of regulations to implement the Global Warming Solutions Act. Please do not hesitate to contact me if you would like to discuss any of these issues further.
Sincerely,



Frank I. Smizik
House Committee on Global Warming and Climate Change
State Representative
15th Norfolk District

Richard Stein, Pioneer Valley Biochar Initiative

Post Office Box 608, Belchertown, MA 01007
www_pvbiochar.org

A Testimony at the Hearing on Massachusetts Energy Policy

Springfield, MA, June 9, 2010

Richard S. Stein*

Biochar is a form of charcoal made by heating to high temperatures agricultural and forestry refuse (biomass) in the absence of or with limited air. About half the carbon that was in the biomass is turned into inert biochar, the other half of the carbon being oxidized and emitted as carbon monoxide and other gaseous compounds of carbon. These carbon compounds (along with gaseous hydrogen and water - that are also formed) can be burned with minimal pollution, and the heat from this burning is more than sufficient to continue the pyrolysis. In more advanced use, a portion of the by products can be converted to liquid fuels and intermediates for plastics or pharmaceuticals.

Biochar was known to the ancients and has been referred to as *The Black Gold of the Amazon.* but it has been rediscovered in our time of climate change as a clever way to remove carbon dioxide from the atmosphere. **It,** like compost, is a soil additive which is used as an aid to agriculture. It differs in its function. Compost, formed from forest, agricultural or domestic waste in familiar compost piles improves the soil texture and adds to its carbon content. However, this carbon does nor remain in the soil for long periods of time but decomposes in less than a decade and gives back its carbon to the atmosphere as CO_2.

On the other hand, biochar is a highly porous form of carbon with large porous are. It does not rapidly react, but its surface serves as a termplate for adsorbing nutrients and promoting the growth of bacteria or fungus, improving plant growth. Biochar experimenters in academia and in the field - in this country and abroad - have demonstrated enhanced agricultural yield with biochar, sometimes by several hundred percent. It mostly remains in the soil as carbon for long periods of time, up to centuries Thus, this carbon is removed from the atmosphere so it may be considered as *"coal mining in reverse"in* that its role is the opposite of that of coal mining where carbon from the earth ultimately is added to the atmosphere. The biochar is best added when blended with compost, but less compost is needed when biochar is employed.

In some unmanaged forests more CO_2 is released to the atmosphere from refuse decomposition than is absorbed from the atmosphere via the photosynthesis that produces tree growth! In these forests it makes sense to convert the refuse into biochar.

Making it locally and regionally:

Biochar can be produced at various scales. It is possible for individual farmers to make biochar using simple home-constructed equipment. In fact, as with Besides the direct effects of CO_2 reduction and agricultural/forestry growth enhancement, there are the following beneficial ecological and economic secondary effects:

1. A decrease up to a factor of two in the amount of fertilizer needed in agriculture. Since fertilizer takes energy and money to make, and since making it produces CO_2 emissions, use of biochar in agriculture lessens energy use, saves money, and lowers carbon emissions.

2. Because of the binding of fertilizer by biochar there is less fertilizer runoff to waterways, hence less destructive algae blooms in lakes.

3. Agriculture with biochar produces less NOX's and other greenhouse gases than agriculture without biochar.

4. Biochar may bind herbicides and pesticides, preventing them from entering food crops.

5. Because of the porous nature of biochar, it binds water, reducing the need for additional water in agricukltural practices

6. USDA and other studies have shown that biochar enhances the quality of grown food.

7. The disposal costs for farm and forestry refuse are reduced.

any endeavor involving growing, processing, or manufacturing -whether it is growing crops, processing a fuel to make electricity, or manufacturing biochar or wood furniture - by the principle called relocalization - the least expensive way of processing or manufacturing in terms of money, energy, and carbon emission is to do these locally, right near the source of the raw materials and the consumers of the product. When distance is reduced, energy and emissions from transportation are reduced, and reduced energy means reduced money for the fuel to transport. Indeed, as one can see, making biochar is best done in places like New England where there is a mix of farms and forests. Making biochar makes green jobs.

Biochar production must be done at a regional, semi-industrial level (with more capital intensive processing equipment) if one wants to process certain by products into liquid fuels or raw materials for plastics and pharmaceuticals. The harvesting of biomass should be carried out on a sustainable level, not removing it from forests at a greater rate than its replacement by new growth so as not to deplete forest resources. Also, biomass free from additives as found in treated lumber and construction waste should not be used. This favors localized use since large scale operation requires gathering of biomass from more distant locations requiring greater transportation costs.

There is need for further study of the economics of biochar. Such studies are currently underway, for example, at Cornell University, at the New England Small Farm Institute in Belchertown, Massachusetts, and in cooperative work with the Department of Plant, Soil, and Insect Sciences at the UMass Amherst. Studies are

occurring abroad, particularly in Japan and in Australia.

Biochar combats climate change and lessens our need for energy as we replace shrinking world oil supplies with alternative energy (world oil production is right now at a peak). And biochar produces local green jobs. Accordingly, it would be judicious for the Commonwealth to aid the R&D in biochar that has been done heretofore largely privately.

* Stein in a retired Professor of Chemistry from the University of Massachusetts, Amherst and one of the founding members of the Pioneer Valley Biochar Initiative. He is a member of both the National Academies of Sciences and of Engineering.

Thomas A. Stone, The Woods Hole Research Center

From:	Tom Stone
To:	"Strategies, Climate (DEP)" <Climate.Strategies@state.ma.us>
Date:	7/14/2010 3:20 PM
Subject:	Comments on GWSA Act

To: Massachusetts Department of Environmental Protection , Bureau of Waste Prevention,
One Winter Street 6th Floor, Boston, MA 02108, Attn: Lee Dillard Adams

Dear Lee Dillard Adams

Below please find my comments on the Comm. of Mass. Draft Climate Implementation Plan for the "Global Warming Solution Act."

The Act requires that statewide GHG emissions be reduced 10 to 25 % by 2020 and that by 2050 GHG emissions be reduced by 80%.

These are highly admirable goals but it is very clear that we can do much better particularly in the short term. Recent reports indicated that RGGI region emissions were 16 to 18% below the RGGI cap by 2008 and were fully 34 % below the RGGI cap by 2009. Of course, much of this is due to the economic decline over the past 2 years but, it also speaks to the how very, very modest the initial goals were. Those initial very modest goals aimed for a 10% decline by 2020 – goals that have been "left in the dust" as measured by current emissions. Of course, the RGGI region is not Massachusetts but I think it fair to assume similar trends here. Finally, with respect to RGGI, is very important that the proceeds from the RGGI program continue to be directly invested in energy efficiency and renewable energy. Other states (e.g. NY) have raided these funds or are planning on raiding these funds (e.g. N.H.).

It would be illustrative for the Commonwealth to develop a Massachusetts specific version of the oft-used McKinsey Abatement curves (figure 2).

Given the enormity of transportation as a source of GHG in the Commonwealth, a reasonable goal would be to double or triple the active bicycle fleet in the state. One needs simply to look at the "Bike to Work" statistics for the last May (http://massbike.org/bsbw/) where riders from hundreds of organizations pledged to ride some 175,000 miles. Vouchers, rewards, subsides etc. all could be used to increase the size of the bicycle fleet (with, of course, the added bonus of providing exercise for our citizenry). Subsides or other incentives could be used to defer the costs of electrified bicycles for those who prefer a little boost.

Certainly some of the wood waste in the Commonwealth from construction materials or elsewhere could be converted into Biochar for use by farmers to improve their soils while more or less permanently sequestering that C in the soil. There is no facility in MA currently producing biochar so the economics

are unknown and there is little research being done on this. There are about 500,000 acres of farmland in Massachusetts that might be used but there is both no available product (biochar) and no incentive. Adding only 1 ton C/acre would sequester 500,000 tons of C (equivalent to 1.8 million tons CO2) less permanently while improving soil quality. (The Commonwealth's electricity sector produces about 23 to 27 million tons of CO2 annually.)

The Commonwealth should work toward producing a complete C budget for the entire state which includes all natural and anthropogenic sources and sinks. A complete knowledge of available sinks would tell us what nature is doing for us now for free and would illuminate where additional sinks might be enhanced via forest management or from reforestation or other land uses.

Other colleagues here at the WHRC have suggested:

Make the Cape and Islands self-sufficient for electrical energy within three, possibly, four, years by supplementing the Cape Wind project with municipal and domestic projects;

Reduce reliance on fossil fuels for electrical power elsewhere throughout the Commonwealth by 25% or more with domestic projects alone;

Develop a Commonwealth-wide program favoring bicycles over automobiles with bicycle paths for commuting with the objective being a series of reductions in gas-powered automobile use starting with 10% in two years and 25% or more in four years;

Develop subsidies for use of small electric cars in commuting, charged with electricity renewably produced at public sites;

Set the objective of 75% of domestic hot water produced by domestic hot water panels within four years. Finally, it is clear with my own companies' experience that buildings can be made largely self-sufficient in our climate when it comes to energy by starting with a very tight building envelope and then careful attention to ventilation, energy use and energy systems. Our headquarters, an 1874-era renovated 19,000 sq. ft building, uses a fraction, perhaps 20% to 40%, of what a "typical" building uses. And, of the energy that we do use, most of it comes from renewable resources – geothermal, wind, and sun. Details for this are available at http://buildingdashboard.com/clients/whrc/.

If the goal for the Commonwealth is to have an 80% reduction in fossil fuel use by 2050, it is important to remember that this means that, essentially, all transportation and all buildings will need to be powered by renewably generated electricity. Overly modest goals achieve, at best, modest results. Given the threats from climate change our goals must be ambitious.

****

Mr. Thomas A.Stone
Sr. Research Associate
The Woods Hole Research Center
149 Woods Hole Rd.
Falmouth, MA 02540
1-508-540-9900 x 124

Alexander Taft, National Grid

Via Email

July 15, 2010

Massachusetts Department of Environmental Protection
Bureau of Waste Prevention
One Winter Street
Boston, MA 02108
Attn: Lee Dillard Adams

RE: Draft Climate Implementation Plan

I am writing on behalf of National Grid regarding the above referenced subject, specifically the framework for meeting the 2020 and 2050 goals of the Global Warming Solutions Act (GWSA). National Grid is an international electricity and gas company delivering energy to millions of customers across Great Britain and the northeastern United States, with gas and electric transmission and distribution operations in Massachusetts, New Hampshire, New York and Rhode Island.

We appreciate the opportunity that the Department has afforded stakeholders to comment on the April 30th, 2010 Draft Climate Implementation Plan. We have attended many of the public hearings, and Marcy Reed of National Grid has participated on the Climate Protection & Green Economy Advisory Committee on behalf of our US President, Tom King. Our comments address the four categories identified in the public hearing slide deck (Transportation, Buildings, Energy Supply and Other) as well as number of the specific questions posed to the public.

Transportation

As determined by the Commonwealth, the transportation sector is the largest contributor of greenhouse gas (GHG) emissions. While the federal government is responsible for two of the most powerful levers — fuel economy and national emission standards —states have been assessing additional tools for reducing carbon in the transportation sector. A number of initiatives have been identified, including the development of a Low Carbon Fuel Standard (LCFS), which would create incentives for using lower carbon transportation fuels by requiring fuel suppliers to meet fuel carbon intensity requirements. We are actively participating in the regional LCFS stakeholder process and cautiously optimistic that the LCFS is a viable option which will mitigate GHG emissions from the transportation sector.

As an electric and gas energy provider we envision taking an active role in the dialogue and implementation of technical solutions which include electricity (electric vehicles) and natural gas (natural gas fueled vehicles). Electric vehicles have rightly been targeted as a primary solution going forward. We presently believe that natural gas powered vehicles also provide a viable alternative to both conventional diesel and gasoline powered vehicles for certain fleet and transit applications and therefore the Commonwealth should also give careful consideration to fostering the development and use of natural gas vehicles and infrastructure.

Buildings

Building shell improvements, CFL and LED lighting and high efficiency heating and cooling systems are simple and cost-effective solutions to reduce GHG emissions. Therefore, we believe that maintaining and supplementing utility energy efficiency programs make an important contribution to addressing climate change. In fact, we are quite excited about the impact on GHG reductions that we believe our enhanced programs will generate in the coming years. In addition, adoption of energy efficiency codes and standards should be pursued to ensure a uniform and consistent approach across the Commonwealth.

CHP has been suggested by some as a mitigation alternative, and while we endorse the use of CHP, the full extent of the opportunity and the implications of net metering need to be better understood. Heat pumps are another technology worthy of pursuit but are more applicable for new construction or major rehabs. Perhaps standards pushing for the use of heat pumps would be appropriate.

Where feasible, switching to lower carbon fuels, e.g., from oil to natural gas, can be a cost effective mitigation measure. Natural gas burns more cleanly (30% or more carbon efficient than fuel oil) and the efficiency of new heating units fueled by natural gas is greater than those fueled by most existing oil fueled equipment.

Energy Supply

We concur with increasing the utilization of low-carbon electricity, such as renewable energy. Our solar generation initiative and proposed agreement with Cape Wind show our commitment to the development of in state renewable resources. However, we should also look more broadly to expand the region's transmission system to allow load access to significant wind resources within the region, such as connecting large amounts of onshore wind resources in northern Maine, as well as increasing offshore wind resources. In addition, the region could increase its energy resource diversity by expansion of the transmission system to allow increased imports of Canadian renewable electricity.

Natural gas remains and will continue to be a viable solution to the climate change challenge. Natural gas is a cleaner burning fuel and therefore preferable to oil from a carbon and fine particulate emissions standpoint. Nonetheless, we recognize that the natural gas infrastructure must be updated and leak prone pipe replaced. In 2009, we completed a level of replacements that doubled the average annual replacement of the preceding five-year period. However, we believe there is a compelling need for an even more sizable ramp-up in these replacements and now are seeking approval from the Department of Public Utilities for a funding mechanism to implement this expanded program. We hope that this approval will be granted for in doing so the Company not only improves the integrity of the distribution system, as well as its safety and reliability for customers and communities, but also simultaneously provides a significant environmental benefit through elimination of methane emissions.

Other

Renewable gas is a viable option and should be considered as an alternative energy source similar to wind or solar power. The biggest driver of renewable gas is GHG reduction, but what makes renewable gas more compelling is that it also enhances diversity of supply while providing a solution to local waste resources issues by using them to produce renewable energy. Attached please find a paper we have recently completed on this subject.

National Grid is encouraged by the lead the Commonwealth has taken to combat climate change. As you may be aware, National Grid has publicly made the commitment to reduce its own GHG gas emissions by 80% by 2050 with an interim target of 45% by 2020. We look forward to working with the Department to aid in the development of the most effective climate implementation plan. To this end we believe that the Commonwealth would further benefit by permitting the deployment of utility-scale clean technology initiatives, whether it be more solar, wind or smart grid. Increasing the scale of these initiatives is important for better analysis and acceptance.

Questions for the Public

Several questions were specifically raised at the public hearings:

2020 Goal:

1. Where between 18 and 25 percent below 1990 levels should the emissions limit for 2020 be set and why?

We would support a reduction target toward the higher end proposed, as high as 25% below 1990 levels, but only if achievable by cost-effective means.

Growing the clean energy economy:

2. What role can Massachusetts state government play in catalyzing the clean energy economy? What policies could inspire entrepreneurship and create markets for clean energy products and services?

Massachusetts has proven to be a leader already. Nonetheless, several suggested improvements in reaching the Commonwealth's full potential for developing the clean energy economy would include the following:

1. Additional support and programs through both direct assistance and approval of initiatives at regulated entities for investments and deployment of innovative technologies, such as electric system "smart grid" investments, renewable gas incentives, and new forms of non-carbon emitting electricity generation.

2. Support for pre-venture capital stage companies in the "valley of death" between lab development and commercialization, such as the Commonwealth's previously active SEED Loan Program at the Renewable Energy Trust.

3. Support for companies between the successful demonstration of a technology and full commercial deployment, such as loans to early-stage manufacturers without access to other forms of capital, for technologies such as transportation electrification and next-generation low-carbon electricity generation.

4. Continue and expand the dialogue between universities, entrepreneurs, the venture capital community and utilities in MA, who all have a role in successfully bringing these technologies into useful deployments.

5. Ensure a consistent, transparent approach, as well as timely responses, to interactions with companies within the private technology and energy industries.

Time horizons:

3. Over what number of years should cost effectiveness of strategies be evaluated in pursuit of the goals of the Commonwealth for 2020 and 2050? How should future costs be compared to present costs?

Absent a price for carbon it is difficult to make any real effective evaluation. As a result, it would be appropriate to research a reasonable cost of carbon for investment evaluations. There is not likely a single answer to the ideally, public benefits and public costs should be measured over their useful and expected durations, and their net values should be discounted at a rate reflective of their societal nature, plus some measure of inflation. National Grid has at times used rates in the 4-6% range for discounting such net benefits and costs.

Criteria:

4. How should the Commonwealth evaluate and prioritize strategies to achieve 2020 and 2050 goals?

To maximize economically viable abatement and manage expectations the use of an abatement cost curve would be appropriate.

Linkage with Adaptation Planning:

5. Some GHG reduction strategies are also strategies for adapting to the climate change that is unavoidable. How should these adaptation benefits be valued or prioritized regardless of the cost/benefit?

Perhaps an example would be the development of a code or standard that applies to actions below the cost curve. These actions would be deemed a higher priority.

If you have any questions or would like to discuss our comments further, please feel free to contact me by email at sandy.taft@us.ngrid.com or by telephone at 781 907 3640.

Sincerely,

Alexander G. Taft
Director US Climate Change Policy

Cc: M. Reed, National Grid
J. Newman, National Grid R.
Teetz, National Grid

Enclosure:
"Renewable Gas —Vision for a Sustainable Gas Network"
http://www.nationalgridus.com/non_html/NG_renewable_WP.pdf

Thomas Tinlin, Kairos Shen, and others, The Urban Ring Compact

The Urban Ring Compact

BOSTON BROOKLINE CAMBRIDGE CHELSEA EVERETT SOMERVILLE

July 14, 2010
Department of Environmental
Protection Bureau of Waste
Prevention
One Winter Street, 6th Floor
Boston, MA 02108
Attention: Lee Dillard Adams

Re: Draft Climate Implementation Plan

Dear Ms. Adams:

The Urban Ring Compact appreciates the opportunity to comment on the Massachusetts Draft Climate Implementation Plan. The Compact commends the Commonwealth in addressing the critical threat of Climate Change. We write this letter out of concern that the Commonwealth will be unable to meet its Green House Gas reduction targets unless it addresses the planning and financing of infrastructure to increase the mode share of public transit ridership. Unless this issue is adequately addressed in more depth, your Plan will not be viewed as a meaningful set of solutions to address GHG emission reductions.

The Urban Ring Compact was formed in 1995 with the express purpose of forging collaboration on the planning and implementation of a new circumferential transit system, called the "Urban Ring", that our members felt was crucial to the economic vitality of our individual communities and to the region as a whole. It includes Boston, Brookline, Cambridge, Chelsea, Everett and Somerville.

The Global Warming Solutions Act, which sets a goal of reducing GHG emissions by between 10% and 25% below 1990 levels by 2020, identifies transportation sources as the largest and fastest growing set of GHG emissions. The July 2009 report by the Department of Environmental Protection predicts that a very significant increase in transportation emissions will occur by 2020 under a "business as usual" scenario. The Draft Climate Implementation Plan identifies transportation as one of the three major

areas of opportunity and recommends, "Prioritization of transportation projects that preserve the existing transportation system, support denser "smart growth" development, and promote increased public transit ridership, walking and bicycling." Prioritizing projects that support non-motorized transportation modes, as opposed to highway capacity expansion projects, is a critical component to meeting statewide GHG reduction goals.

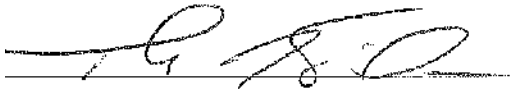
Yet the Boston Regional Transportation Plan modeling results indicate that these important policy objectives will not be met. The projected automobile mode share in 2030 is 73%, with no difference expected between implementing the RTP (the "build" scenario) and not implementing the RTP (the "no-build" scenario). One of the policy statements listed in Chapter 10 of the Regional Transportation Plan states, "Give priority to projects that maintain and improve public transportation facilities and services, so as to increase public transportation mode share and reduce reliance on automobiles." However, the transit mode share projected for 2030 is only 0.1% greater than the "no-build" scenario.

Significant growth in transit ridership demand is anticipated by 2030. The Regional Transportation Plan indicates transit ridership is expected to increase by 50% from about 900,000 daily trips in 2000 to about 1.3 million trips in 2030. Given that the transit system is already under significant pressure during peak times, the Commonwealth will be unable to meet this demand for transit without a significant commitment to the expansion of our transit system.

The Green Line Extension, Urban Ring circumferential transit system, Silver Line Phase III are examples of transportation expansion projects that are necessary to ensure both the economic vitality of our region as well as meet our GHG reduction goals. For example, The Urban Ring Phase 2 project would reduce vehicle miles travelled by about 200,000 per day (compared to the No-Build Alternative), eliminating over 225,000 pounds of greenhouse gas emissions daily.

Finally, we strongly believe that a successful and meaningful Climate Implementation plan must take into account the chronic underfunding of the MBTA, both for achieving reasonable metrics on state of good repair and also for implementing necessary expansion projects. GHG emissions cannot be effectively reduced in the absence of a specific, funded approach to improving transportation access through public transportation. We urge you to consider a more comprehensive and specific statement about the necessity to improve and expand MBTA service as a critical part of the overall plan. Our current transit system is far from being in a state of good repair, with billions of backlogged capital maintenance projects. To successfully reduce the reliance on single occupancy automobile travel and achieve a mode shift toward transit, we must provide safe and reliable service.

Sincerely,



Thomas J. Tinlin, Commissioner
Boston Transportation Department

Kairos Shen, Chief Planner
Boston Redevelopment Authority

Vineet Gupta, Director of Planning, Transportation Department, City of Boston

Jeffrey Levine, AICP, Director of Planning, Town of Brookline

Susanne Rasmussen, Community Development Department, City of Cambridge

John DePriest, AICP, Director of Planning & Development, City of Chelsea

Marzie Galazka, Director of Planning & Community Development, City of Everett

Monica R. Lamboy, Strategic Planning & Community Development, City of Somerville

Cc: Urban Ring Citizens Advisory Committee

Timothy Travers, National Fire Sprinkler Association

40 JON BARRETT ROAD ● PATTERSON, NEW YORK 12563 ● (845) 878-4200 ● FAX (845) 878-4215

E-MAIL: INFO@NFSA.ORG ● WEBSITE: HTTP://WWW.NFSA.ORG

June 29, 2010

Attn: Lee Dillard Adams

Massachusetts Department of Environmental Protection Bureau
of Waste Prevention
One Winter Street, 6th Floor
Boston, MA 02108

RE: Public Hearings on Massachusetts' proposed range for the 2020 greenhouse gas emissions limit and draft implementing plan as required by Chapter 298 of the Acts of 2008, the Massachusetts Global Warming Solutions Act (GWSA).

Dear Lee Dillard Adams,

As the Secretary of EOEEA, in consultation with other state agencies, regional authorities, and the public set an economy-wide greenhouse gas (GHG) reduction limit for Massachusetts, the benefits of automatic fire sprinklers should not be overlooked.

Greenhouse gases, most notably CO2, are significantly reduced when unwanted fires are addressed by fire sprinklers. Dr. James Marsden analyzed the fire problem of the County of Greater Manchester, UK. His estimates were based on 1.86 ounces of CO2 released per 1.2 yd^2 per second of burning material. Plus the assumption of a radiant feedback of 66 kW/m^2 and an estimated arrival and extinguishment time of 15 minutes for the fire department. Estimates of burn areas were 24 yd^2 for dwellings, 7.2 yd^2 for cars, 4.8 yd^2 for rubbish fires, and 120 yd^2 for industrial or commercial fires. Calculations showed 3,000,000 metric tons (3,306,930 US tons) of CO2 released just in that one region from unwanted fires in 2006-07. Fire sprinklers will not guard against automobile fires or most outdoor rubbish fires (yet), but just taking into account the structure fires and the possibility of significantly reduced CO2 output from one metropolitan region in one year. Now, imagine this across the Commonwealth of Massachusetts.

Two recent reports by FM Global Research Division, "Environmental Impact of Automatic Fire Sprinklers" (March 2010) and "The Influence of Risk Factors on Sustainable Development" (March 2009) examine the benefits of automatic fire sprinklers.

In the first report "Environmental Impact of Automatic Fire Sprinklers" (March 2010) in the "conclusions" section states:

"The research presented in this report has demonstrated that automatic fire sprinklers protect the environment while further verifying that they reduce property damage and protect lives."

In the second report "The Influence of Risk Factors on Sustainable Development" (March 2009) in the "abstract" section states:

"Effective risk management through the use of automatic fire sprinkler systems reduces these life cycle emissions to minimal levels."

These reports have been enclosed (attached in email) for further examination by the Secretary.

In closing, the Massachusetts Board of Building Regulations and Standards (BBRS) will be deliberating the adoption of the 2009 edition of the International Residential Code® in the near future, with a public hearing tentatively to be held in November. All model building codes in effect today include the requirement for automatic fire sprinkler systems in newly constructed one and two family homes. Unfortunately, many anti-sprinkler groups (home builders, realtors, water purveyors, etc.) have been successful in having the sprinkler requirement removed from the code before adoption. We pray this won't happen in Massachusetts, and look forward to positive input from the Massachusetts Department of Environmental Protection, Bureau of Waste Prevention when the hearings begin.

Sincerely,

Timothy P. Travers
Timothy P. Travers, EFO, CFO New
England Regional Manager National Fire
Sprinkler Association
751 Washington St.
Whitman, MA 02382-1315
Travers@nfsa.org
Phone 781-706-0839

Enclosures:
"Environmental Impact of Automatic Fire Sprinklers" (FM Global March 2010)
http://www.fmglobal.com/assets/pdf/P10062.pdf

"The Influence of Risk Factors on Sustainable Development" (FM Global March 2009)
http://www.fmglobal.com/assets/pdf/P09104a.pdf

NFSA's "Fire Sprinklers Are Green!" Brochure

David Turcotte, City of Lowell Green Building Commission

City of Lowell - Green Building Commission

DIVISION OF PLANNING AND DEVELOPMENT
JFK Civic Center/50 Arcand Drive Lowell, MA 01852
Adam Baacke, Assistant City Manager/DPD Director
Anne M. Barton, Deputy Director.

Date: July 14, 2010

RE: Support Letter for Global Warming Solution Act

Lee Dillard Adams
Manager, Global Warming Solutions Act Implementation
Massachusetts Department of Environmental Protection,
One Winter Street
Boston MA 02108

Dear Ms. Dillard Adams,

The Lowell Green Building Commission (GBC) had three of our members at the Public Hearing on June 7, 2010 in Lowell, MA. Two members (Stephen Greene and David Oulette) testified briefly. We now offer this written testimony with the benefit of input and comment from all GBC members.

The GBC agrees with and supports a 20% GHG reduction goal for 2020. We feel that it would be good to achieve a higher reduction if it is economically feasible. We understanding that addressing the economic impact of a higher goal is important and should be part of the decision process for going beyond the initial 20% goal.

We support GHG reduction efforts in the five basic areas which coincide with the work objectives of the Lowell Green Building Commission:

1) Work on Transportation related GHG reductions. Some ways to achieve this are-
   Smart Growth
   Encouraging LEED Neighborhood development
   Expanding Public Transportation (and potentially the replacement of current buses/taxis with new, more efficient vehicles)
   Develop innovative shared car use programs

2) Improve Buildings:
   Energy efficiency through weather stripping to reduce infiltration and add/ improve insulation in buildings
   Use new technology to monitor and maintain air quality to avoid past problems with poor indoor air quality and excess moisture with tight buildings
   Improved windows in old buildings
   Use energy efficiency and weather stripping work as way to train and employ people
   Provide incentives for improving building lighting, appliances and HVAC energy efficiency.
   Improved building codes

Improve compliance with building codes.
Improved training of building inspectors

3) Waste Management
   Reduce the generation of waste and the impacts of the materials wasted
   Divert more disposed materials though recycling improvement
   Modify the language of the waste bans to make enforcement easier at the point of waste generation.
   Assure proper management of Hg from end of life energy efficient CFL bulbs and any subsequent technologies

4) Industry
   Apply smart growth principles to businesses
   Smart clustering of business facilities for better efficiency and shared resources
   Cogeneration for greater energy efficiency - consider district heating.
   Look into new ways to achieve the work objective. (Get beyond doing something efficiently that should not be done or should be done completely differently).

5) Cross cutting
   Use incentives (negative and positive) to promote efficiency and sustainability
   Develop education and awareness programs the empower the citizens of Massachusetts to act in the interest of improving our sustainability objectives
   Examine policies and programs holistically, understanding where tradeoffs are being made.
   Review programs and regulations routinely to account for new information or technology.

We appreciate the opportunity to comment.

Should you have any questions, please contact me.

Sincerely,

David Turcotte, Chair
Lowell Green Building Commission

David Wagner, Atlantic Hydrogen Inc.

Lee Dillard Adams

Mass DEP

Bureau of Waste Prevention

One Winter Street, 6th floor
Boston, Massachusetts 02108

RE: Draft Climate Change Implementation Plan

Dear Mr. Dillard Adams:

Atlantic Hydrogen Inc. (AHI) is the developer of CarbonSaver[a], a "sustainable gas" technology to reduce greenhouse gases (GHGs) and other emissions from natural gas consumption. We are pleased to submit comments on the Massachusetts Draft Climate Implementation Plan, and document herein both the broad industrial support and cost-effectiveness of our technology to help achieve the goals of the Global Warming Solutions Act. We also propose specific policy measures to maximize the benefit of sustainable gas as an abatement option.

1. Industry Support for Hydrogen-Enriched Natural Gas as "Sustainable Gas"

Sustainable gas is a source of electrical and thermal energy that can meet the needs of the present without compromising the ability of future generations to meet their own needs. Landfill gas is one sustainable gas option that is being considered. Another is hydrogen-enriched natural gas or HENG, produced by decarbonizing natural gas using a GHG-free process and delivering it to through existing natural gas networks. HENG reduces GHGs, carbon monoxide (CO), unburned hydrocarbons and NOx in flue gases. It can also improve the efficiency of end-use equipment, including power generation devices. The carbon black, which is extracted from the natural gas before combustion, has applications in metallurgy and manufactured rubber goods. AHI is currently demonstrating its CarbonSaver[a] technology at various points in the natural gas system, including large reciprocating engines, local distribution networks and combustion turbines.

For more than two years, AHI has been collaborating with National Grid, with U.S. operations headquartered in Waltham, MA, on the development of CarbonSaver[a] as a sustainable gas technology. This effort builds on the results of the European Union-supported NaturalHy project, which has scientifically validated the feasibility of delivering HENG through existing natural gas infrastructure (see Exhibit A).

In a joint position paper released in July 2009, National Grid and AHI established HENG as a sustainable gas that has applications from wellhead to burner tip (see Exhibit B). It was determined that HENG has the potential to reduce GHG emissions by more than 111 million tonnes per year from U.S. sources. Of this, Massachusetts would realize GHG reductions in the range of 2 million tonnes per year.

The National Grid-AHI position paper informed testimony before the Massachusetts Department of Public Utilities. On April 16, 2010, the DPU heard Mr. Stanley Blazewicz, Global Head of Technology for National Grid, call for more technology and innovation investments to support the deployment of HENG as a sustainable gas. The paper also led to a broader collaborative industry effort, involving a consortium of U.S. natural gas distribution companies, to review the potential of HENG as an approach to reducing GHG emissions.

In addition to the above-mentioned industrial support for HENG as a sustainable gas, AHI has concluded or is completing the following commercialization activities with the goal of commissioning two CarbonSaver[a] plants in the U.S. by 2012 and ramping up to 60 plants by 2016:

1. Continuous operation of a 75 kW combined heat and power system supplied by Waltham-based Tecogen, Inc., using HENG to reduce emissions and improve engine efficiency.
2. Successful demonstration of HENG with a 30 kW micro-turbine supplied by U.S.-based Capstone Turbine.
3. Preliminary engineering for a CarbonSaver[a] unit at a large compressor station located on a major U.S. pipeline in the Gulf Coast area, to be completed in December 2010.
4. Testing of HENG at a power generation facility using a 42 MW gas-fired, aero-derivative turbine manufactured by General Electric, to be completed in early 2011.
5. Demonstration of CarbonSaver[a] at a National Grid pressure reduction station or "city gate", to be commissioned in 2011-12.

2. A Cost- Effective GHG Reduction Strategy

We have reviewed the strategies proposed by Eastern Research Group (ERG) in the draft report, entitled *Cost-Effective Greenhouse Gas Mitigation In Massachusetts: An Analysis of 2020 Potential* and analyzed the abatement curve in the report entitled *Reducing U.S. Greenhouse Gas Emissions: How Much at What Cost?* prepared by McKinsey & Company in 2007.

The sector-specific solutions proposed by ERG within the context of the McKinsey abatement curve relate to natural gas usage in two ways. The first is switching from oil to natural gas in all sectors, but in particular utilizing low carbon fuels for transportation and heating. The second is realizing improved efficiency, principally from more industrial and commercial co-generation. These proposals reflect that natural gas is already recognized as an important part of the solution to climate change, as it has the smallest carbon footprint among fossil fuels and can be used with high efficiency. But further emissions reductions are possible when sustainable gas, in particular HENG, is considered.

AHI and National Grid estimate the cost of GHG abatement from HENG is in the range of $12 per tonne. The projected capital cost of a CarbonSaver[a] facility is comparable to the cost of equivalent-sized hydrogen and gasification plants available today. The largest single operating cost is the electricity for the plasma arc, and this power may be drawn at an attractive price from abundant off-peak generation capacity.

Notwithstanding the slightly lower heating value of HENG compared with natural gas, the hydrogen in the natural gas improves the fuel conversion rate of appliances, leading to an overall reduction in natural gas consumption in many cases. Finally, revenue from the sale of carbon black for industrial applications significantly offsets the fixed and operating costs. And since the price of carbon black is highly correlated to the price of oil, it is possible to achieve GHG abatement at a negative cost as the price of oil approaches $120 per barrel.

Figure 1 shows that with a GHG abatement cost in the range of $12 per tonne and a potential to reduce total GHGs by 111 million tonnes, HENG from CarbonSaver[a] is highly competitive with many energy- related GHG reduction strategies under consideration. Certainly it is less expensive than some of the more optimistic projections for post-combustion carbon capture and storage (CCS) technologies that are estimated to be $40 to $60 per tonne by 2030.

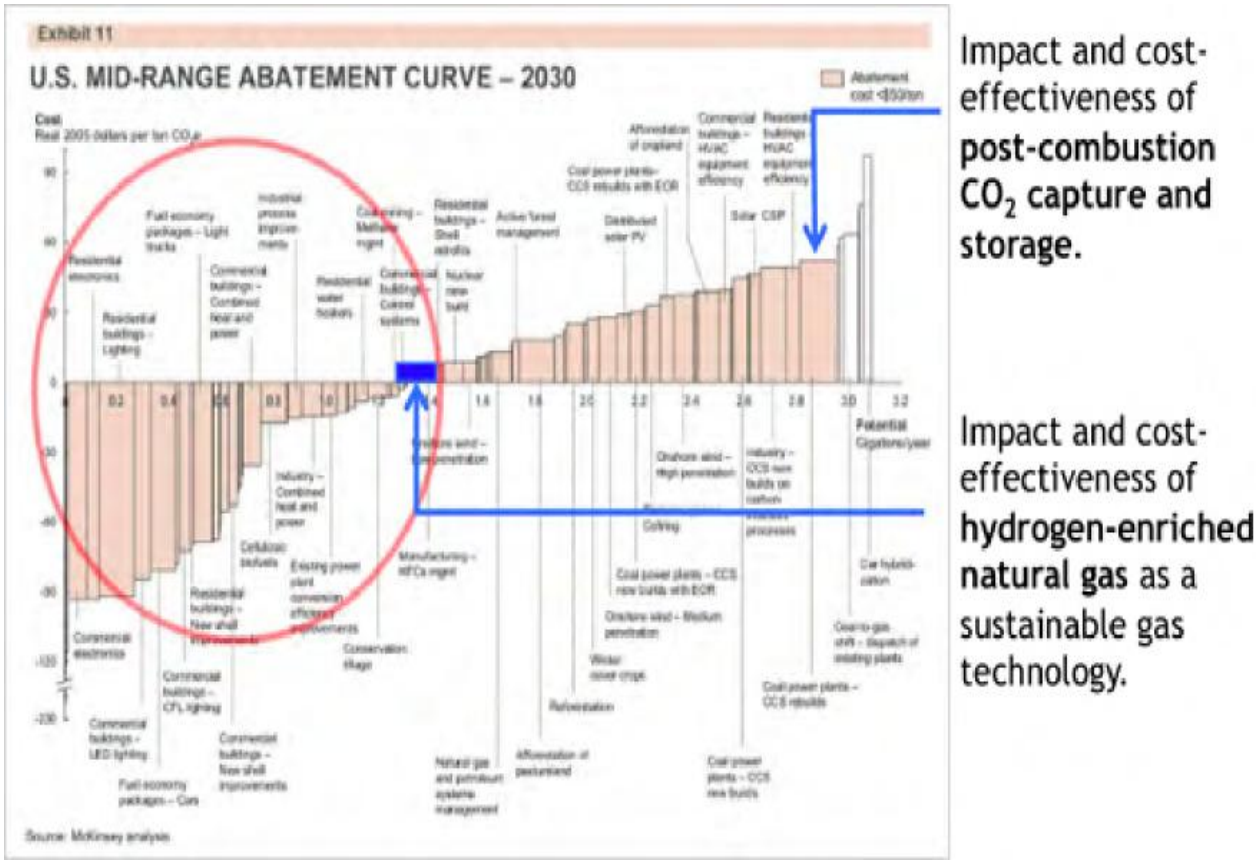


Figure 1: McKinsey & Company Cost Curve Showing Impact of Cost Effectiveness of Hydrogen-Enriched Natural Gas as Sustainable Gas.

3. Policy Tools to Advance Hydrogen-Enriched Natural Gas as "Sustainable Gas"

There are no insurmountable barriers to delivering HENG as a sustainable gas using existing natural gas infrastructure. Historically, gas distribution systems in Massachusetts carried hydrogen in manufactured gas, a practice that continues today in places such as Hong Kong and Hawaii. Technically, HENG production and injection into the distribution network is possible and safe, as long as the gas meets local gas-quality specifications. And while HENG has a lower

calorific value than regular natural gas, the gain in fuel efficiency in the end-use appliance means that the customer may actually consume less gas.

All this, however, should not serve to underestimate the effort required to deliver HENG as a sustainable gas. The following two policy developments are urgently required.

1. **Sustainable gas including HENG should be a component of the Renewable Portfolio Standard (or the Alternative Energy Portfolio Standard) and the Low Carbon Fuel Standard.**

Through the Green Communities Act (GCA), Massachusetts has advanced various renewable electricity production options using RPS standards, promoting utility purchase and ownership of renewable generation assets. More recently, Massachusetts has encouraged combined heat and power (CHP) by adopting Alternative Energy Production Standards (AEPS).

We urge the DEP to support the use of HENG as a sustainable gas either through the Renewable Portfolio Standard or the Alternative Energy Portfolio Standard to build on the policy options in the GCA. These incentives would substantially increase GHG reductions from industrial, commercial and residential natural gas sectors as well as realize deeper GHG reductions from the electric generation sector.

Finally, we believe that HENG can be deployed as part of a low carbon transportation and heating strategy, given compelling test results using HENG in transit buses equipped with heavy-duty engines by Cummins-Westport and CHP systems by Tecogen. We note with interest the recent presentation by Commissioner Burt regarding a Low Carbon Fuel Standard in concert with NESCAUM, the ten RGGI member states and Pennsylvania.

2. **More technology and innovation funding support is required to deploy sustainable gas in natural gas networks.**

Massachusetts should continue to fund R&D into low carbon technology. This support should be extended to cover the decarbonization of natural gas before combustion and the development of value-added applications for the carbon once it has been captured. Demonstration plants should be built quickly to jump-start the industry and provide valuable technical and commercial data to support and guide the development of energy policy. This can be accomplished by the Department of Public Utilities allowing the ten investor-owned and four municipal natural gas utilities in Massachusetts to include sustainable gas investments in their overall cost of service that determines the rates they charge their customers.

In closing, we thank you for the opportunity to submit comments on the Massachusetts Draft Climate Implementation Plan. As we have shown, hydrogen-enriched natural gas, or HENG, addresses two dominant energy and environmental issues: improved energy management and decarbonization. The broad industrial support and cost-effectiveness of HENG as a sustainable gas

make it an attractive policy option to achieve the goals of the Global Warming Solutions Act in Massachusetts. We look forward to working with you and your team.

Yours sincerely,

David Wagner President
and CEO

Enclosures:
"Preparing for the Hydrogen Economy by Using the Existing Natural Gas System as a Catalyst
http://www.naturalhy.net/docs/Naturalhy_Brochure.pdf

"Hydrogen-Enriched Natural Gas: Bridge to an Ultra-Low Carbon WorldD"
http://www.atlantichydrogen.com/uploads/Website_Assets/AHI_NGG_White_Paper_Final_July_7_2009.pdf

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Via Electronic Mail

Jul$_v$ 15, 2010

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Bureau of Waste Prevention
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Boston, MA 02108

Attn: Lee Dillard Adams

Public Comment of ENE (Environment Northeast) concerning the 2020 Emissions Target and Climate Policies for Achieving Reductions

ENE (Environment Northeast) appreciates the opportunity to submit comments in response to the Secretary of Energy and Environmental Affairs' solicitation of input on the 2020 greenhouse gas ("GHG") emissions target under the Global Warming Solutions Act ("GWSA") and measures to achieve the 2020 target. These written comments supplement ENE's oral comments provided at the Lakeville public hearing (June 8, 2010) and the Boston public hearing (June 14, 2010). ENE is a regional non-profit organization that researches and advocates innovative environmental policies for New England and eastern Canada. ENE is at the forefront of state, provincial, and regional efforts to combat global warming with solutions that promote clean energy, clean air, healthy forests, and a sustainable economy.

With the enactment of the GWSA (the "Act"), Massachusetts took an important step in combating the forces of climate change in our state. The environmental and energy agencies of the Commonwealth will play an integral role in ensuring that the GHG reductions set out in the GWSA are met through careful implementation of many of the Act's provisions. Setting a clear, aggressive and achievable 2020 target will put Massachusetts on the path to realizing the economic and environmental benefits that will accompany a long term GHG mitigation strategy. Even more crucial is the concerted effort to adopt and sustain policies that will achieve the 2020 target and set the course for achieving 80% reductions in GHGs by 2050.

I . Setting the 2020 GHG Emissions Target

ENE urges the Secretary to set the 2020 GHG emissions target at 25% below 1990 levels, as permitted by the Act.[1] Based on the existing data, including the Eastern Research Group ("ERG") reports dated April 30, 2010 and May 3, 2010, Massachusetts is likely to achieve at least a 25% reduction in GHG emissions through a combination of (a) sustaining existing policies and (b) the adoption of additional cost-effective climate policies.

While it is important that we look at all possible actions to reduce our GHG emissions, it is appropriate to recognize the most cost-effective and pursue those options first. The May 3, 2010 ERG draft report is a helpful tool in guiding the Commonwealth, but it should not be used as a limiting factor for the development of the 2020 target, or climate mitigation policies for the Commonwealth. Because Massachusetts can move forward with aggressive goals through cost-effective and cost-saving policies, the Secretary should set the 2020 interim target at 25% below 1990 levels. Massachusetts should then strive to achieve and exceed this target by a sustained commitment to thoughtful long, medium and short-term solutions.

II . Selected Measures for Achieving GHG Reductions by 2020

To be sure, the Commonwealth will need to deploy many policies to achieve its 2020 and 2050 GHG targets under the Act. Below, we highlight four principal areas where sustained commitments will provide economic opportunities and meaningful GHG reductions.

A. Energy Efficiency

All Cost-Effective Energy Efficiency for Gas and Electric Utilities

Massachusetts has long been a leader in energy efficiency policy. The adoption of the Green Communities Act ("GCA") in 2008 provides the framework necessary for this leadership to continue. The GCA requires the state's electric and natural gas distribution utilities as the energy efficiency program administrators (PAs) to procure "all cost-effective energy efficiency" through the development of three-year energy efficiency plans. The first three year plans were approved in January 2010 and will lead to unprecedented levels of energy efficiency savings for consumers as well as significant GHG reductions.[2]

Under the approved plans, Massachusetts will see investments of over $1.2 billion in electric efficiency programs and approximately $ 355 million in natural gas programs. These investments in turn will collectively bring net benefits of approximately $ 3.9 billion from electric and natural gas programs. The electric energy efficiency programs in the three-year plans provide other benefits relevant to the state's environmental goals, such as reducing the equivalent of 9.7 million short tons carbon dioxide over the three-year period. The natural gas energy efficiency programs are expected to reduce statewide carbon dioxide emissions by over 5.2 million short tons over the life of the savings.

[1] See Gen. Laws. c. 21N § 4.

[2] Over the next three years, collectively, the state's electric PAs must achieve 2.62 million MWH in annual electric energy savings and the natural gas PAs must achieve 57. 3 million therms in annual natural gas efficiency savings. The 2012 annual savings targets of 1.1 million MWh and 24.7 million therms means that efficiency savings will equal approximately 2.4% of retail electric sales and 1.15% of retail natural gas sales, levels that have not been achieved in any other state.

The first three-year planning cycle brings great promise of strong GHG emissions reductions and consumer energy savings. In order to maximize both benefits of energy efficiency, we need to ensure a sustained commitment to the all-cost-effective-efficiency mandate over time. We urge the Commonwealth to continue its support not only for the investment commitments in the recently approved three-year natural gas and electric energy efficiency plans, but for sustaining high levels of investments in future three year plans. With the approval of the first three year plans, Massachusetts has become the national leader in cost-effective efficiency investments; sustaining its commitment over many years is one of the most cost-effective and meaningful climate strategies at our disposal.

Combined Heat and Power

While these accomplishments set us on the right path, we can go even further by increasing our investment in combined heat and power ("CHP"). CHP can play a greater role in contributing to a reduction in kWh sales beyond the 0. 3 — 0.5 reductions anticipated through 2012 in the three year efficiency plans. CHP projects that follow thermal loads have shown the potential for high efficiency levels that ensure climate and economic benefits. A review of the studies conducted in New York and Massachusetts indicate "technical CHP potential between 40% - 62% of total electric load, with a mean of 51%."[3] Through the Climate Implementation Plan, the Commonwealth has an opportunity to create new policies and facilitate greater investment in CHP technology. Appropriate CHP projects also move demand off the system, thus benefitting all ratepayers by reducing the clearing price for wholesale electricity.

Unregulated Fuels

Massachusetts should take this opportunity in developing the Climate Implementation Plan to address the need for efficiency programs for customers who heat homesIbusinesses with heating oil, propane, wood and other unregulated fuels. ENE estimates that through a concerted effort to invest in all-cost-effective energy efficiency for these fuels, Massachusetts can avoid up to 2.7 million short tons per year.[4] The May 3, 2010 ERG Draft Report correctly identifies energy efficiency efforts, particularly on the heating oil side as an untapped area of energy savings.[5] Adding heating oil to the energy efficiency portfolio is a resource we must pursue. The ERG draft report cites growth opportunities for heating oil efficiency similar to opportunities in the natural gas growth.[6] While the Report does not address efficiency programs for other unregulated fuels, we urge the Department to address these untapped areas and explore opportunities to provide efficiency and generate savings for homes/business that use unregulated fuels.

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[3] Assessment of All Available Cost-Effective Electric and Gas Savings: Energy Efficiency and CHP, Submitted to the MA EEAC by its Consultants at 1 3 (May 26, 2009 Revised).
[4] http:IIwww.env-ne.orgIpublicIresourcesIpdfIENEEEECONMAFINAL.pdf
[5] ERG Final Report, at 10 (April 30, 2010)
[6] See id. at 11.
construction during building and renovation will begin a stream of energy savings—and the dollar and GHG savings that flow from them—for decades to come. Massachusetts must seek out many more such opportunities in the future, including improved building energy code compliance; and giving renters, homeowners and buyers more information through building energy labeling requirements.

Appliance Standards and Building Codes

We also urge the Commonwealth to pursue opportunities to improve building codes and appliance standards. Massachusetts' pursuit of a Department of Energy waiver for furnace standards is one example of a change that would bring meaningful and cost-effective climate benefits. If granted, the 90% AFUE furnace standard would, between 201 3 and 20 30, save the state approximately 19.4 million therms in terms of gas usage and $144 million in heating costs, and reduce GHG emissions by approximately 100,000 metric tons over the same time period. Similarly, the Commonwealth's adoption of a stretch code for building energy is another example of a policy with long-term climate and economic benefits. Ensuring more efficient

B . Balanced Biomass Policy

Biomass has the potential to provide a sustainable source of energy while supporting economic development in forest communities, but safeguards are needed to ensure that biomass development does not produce adverse impacts on the climate or the local environment. Potential incentives for biomass power under the Massachusetts Renewable Portfolio Standard and RGGI must be structured to ensure that biomass provides maximum climate benefit while preventing detrimental impacts to air quality and to forest ecosystems. When determining the eligibility of biomass energy for renewable energy credits and the compliance obligation for biomass plants under RGGI, Massachusetts should comprehensively evaluate the benefits and drawbacks of biomass development, drawing on the Biomass Sustainability and Carbon Policy Study recently completed for the state of Massachusetts, and including assessment of (at least) the following:

1) Climate Impacts

Some biomass plants emit CO2 at higher rates than the dirtiest coal fired power plants, and older biomass technologies in particular can have very high CO2 emission rates. The average CO2 emissions rate for biomass in the northeast is over 2,600 lbs/MWh compared to about 2,000 lbs/MWh for existing coal boilers. CO2 emissions can theoretically be recaptured through regrowth of forests if the carbon sequestered in regrowth is equivalent to the emissions from the power plant. For this reason, biomass is often claimed to be "carbon neutral." However, life-cycle carbon neutrality can only be achieved if biomass projects rely on energy from wood waste or source material from sustainably-harvested virgin wood. If biomass is harvested at unsustainable levels, expanded biomass generation will cause increased net CO2 emissions.

2) Criteria Pollutants and Toxics

Biomass generation plants can emit high amounts of other pollutants such as nitrogen oxide (NOx) and particulate matter (PM); depending on feedstock, these plants can emit toxics including arsenic, antimony, beryllium, cadmium, chromium III, chromium VI, copper, lead, mercury, nickel and selenium. We need to assure that any new biomass policies address these pollutants appropriately.

3) Forest Ecosystem Impacts

Expanded biomass generation poses questions about how increased harvesting would impact forest ecosystems.

C . The Regional Greenhouse Gas Initiative

Thanks in great part to the Commonwealth's leadership, the Regional Greenhouse Gas Initiative ("RGGI") is presently the only mandatory carbon cap and trade program in the United States. RGGI has shown that bipartisan efforts by diverse states can deliver a reasonable and transparent market-based environmental policy that puts a price on carbon and guides investment towards cleaner sources of energy.

In order to capitalize on RGGI's success and broaden the program's impact going forward, it would benefit the Commonwealth to build on our experience and consider a number of amendments to strengthen and expand RGGI. In anticipation of the program review the states have committed to, we encourage Massachusetts to take a leadership role in examining the issues below and to prepare necessary program changes.

Addressing the RGGI Cap Level

Emissions from RGGI units have declined dramatically since 2005, due primarily to lower natural gas prices and declining energy consumption. Emissions from RGGI facilities in 2009 were about 34% below the cap (124 million tons emitted versus a cap of 188 million tons).[7] Additionally, since the formulation of the cap in 2005, all 10 RGGI states have established or increased utility sector renewable energy requirements,[8] which, in conjunction with increased efficiency investments have brought emissions down across the region. This decline in emissions is a good thing and gives the states the opportunity to bring the RGGI cap down more quickly than anticipated.

Massachusetts should encourage RGGI states to initiate a thorough review of emissions trends and of the quantity of allowances likely to be banked in the first compliance period. States should then establish a cap level based on actual 2009 emissions, with adjustment for banked allowances that could inflate the cap in subsequent years. From the revised level, the cap should decline 10% by 2018. Potential inclusion of other sectors or states/provinces in the near-term could also necessitate a review of the total cap and distribution among states.

Expansion of RGGI to Other Sources of Emissions

Electric sector emissions in the RGGI states account for about 25% of total state emissions (EIA). RGGI only covers facilities with generating units over 25 MW in size, and emissions associated with imported power, industrial facilities, and other sectors are not covered. When the original RGGI commitments and work plan were developed, RGGI states envisioned covering other sources of emissions in a second phase. Massachusetts and 4 other RGGI states — Connecticut, Maine, Maryland, and New Jersey — have economy-wide emissions limits or targets, and including some or all of the 75% of emissions from sectors and sources not yet

[7] See ENE report on RGGI emissions trends and drivers at: http:IIenv-ne.orgIresourcesIopenIpIidI1072

[8] For additional information, see http:IIapps1.eere.energy.govIstatesImapsIrenewableportfoliostates.cfm

covered by RGGI would help Massachusetts achieve GHG reduction targets and deliver additional emissions reduction across the region.[9]

Massachusetts should commission analysis and seek input from stakeholder groups on potential expansion of RGGI to other sectors, including but not limited to the following:

- Quantification of electric sector emissions not covered by RGGI, including both power plants within the region and emissions associated with imported power; analysis of how these emissions have changed since the initiation of RGGI; and, potential new thresholds for inclusion in the program and options for regulating imported power.
- Quantification of emissions from other sectors, including from large stationary sources and from fuel combustion in the residential, commercial, industrial, and transportation sectors; for large stationary sources the evaluation should include distinct source categories, their respective emissions and the degree to which such categories are energy-intensive and trade-exposed.

Reviewing and Revising the Allowance Reserve Price

RGGI states established an initial reserve price at $1.86 per ton in order to prevent collusion in the allowance market and to create sufficient incentives for carbon reductions. The reserve price should be revised in the future to assure that programmatic goals continue to be achieved. Additionally, market participants and entities relying on RGGI revenue for funding would be able to plan more effectively and make best use of resources if RGGI states were to establish a clear and predictable mechanism for adjusting the reserve price higher over time. When revising the reserve price, we encourage RGGI states utilize straightforward and transparent approach to adjusting the reserve price upward on a regular basis.

Apply the 5-Part RGGI Offset Test to Additional Offset Type Categories

RGGI's Five Part Test for offset projects is a critically important standard that is designed to ensure offset credibility and integrity. The joint white paper Ensuring Offset Quality[10] rightly holds up RGGI's standardized approach as an example of sound offset policy. In the next phase of RGGI, Massachusetts should lead RGGI in building on this strong foundation in two critical and related respects. First, RGGI should refine how the 5-part test can be applied to new offset types so that the rigor, enforceability and credibility necessary for meaningful offsets are articulated. Second, RGGI should qualify other offset project types that are relevant to RGGI region, particularly forest offset types that are more likely to occur in the marketplace than afforestation. Forests play an important role in the carbon cycle within the Massachusetts and beyond, and climate policy should harness the power of standing forests to sequester carbon.

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[9] RGGI could link with other cap and trade programs or allow other jurisdictions to join RGGI and impose a cap on their electric generation. We understand that there are ongoing conversations between the RGGI states and other regions and we applaud Massachusetts' contribution to this collaboration. We encourage Massachusetts to continue conversations on linkage with other regional initiatives andIor allow other jurisdictions to join RGGI. As a way to expand RGGI and harmonize RGGI with other programs under development, we also encourage collaboration on expanding to other sectors of the economy and on capturing additional electric sector emissions (by covering currently excluded smaller sources).

[10] http:IIwww.rggi.orgIdocsIThreeRegionsOffsetsWhitepaper051710.pdf

Furthermore, applying RGGI's 5-part test to forest management would provide precedent for applying rigorous offset standards to these offset project types for states and provinces outside the RGGI region. As interest increases in forest management and agricultural offset projects (which confront technical issues similar to forest-based projects), adopting a rigorous forest management protocol would shape regional and national policy and create a framework for achieving critical GHG reductions in the land-use sector. We reference the detailed proposal submitted to RGGI in July 2009 by the Maine Forest Service, ENE and Manomet Center for Conservation Services.[11]

D . A Sustained Commitment to a Regional Low Carbon Fuel Standard

ENE urges Massachusetts to continue and sustain its work and leadership in developing a regional low carbon fuel standard, and supports its inclusion in the Climate Implementation Plan.

This effort should remain a priority for the Commonwealth not only as a climate mitigation policy, but also as a tool to stimulate economic development. The adoption of a low carbon fuel standard will help non-petroleum technologies compete in the transportation fuels marketplace—vehicles powered by electricity, low-carbon biofuels and natural gas will help reduce our dependence on oil, and will expand consumer choices. With limited additional infrastructure and the availability of vehicles, consumers would likely

find that electric and natural gas vehicles allow them to travel at a lower cost than today ($/gallon-equivalent). Massachusetts, with its history of innovation and its rich human capital stands to be an exporter of advanced technologies that will prosper under a low carbon fuel standard.

Moreover, the LCFS will bring real climate benefits to the state and region—assuming a 10% reduction in carbon intensity over 10 years, the LCFS is projected to reduce the region's GHG emissions by up to 30 million tons annually. We urge you to keep the low carbon fuels program front and center in the Climate Implementation Plan, and the Commonwealth should establish, at a minimum, a target of 10% reduction in the carbon intensity of fuels over a reasonable time period.

III. Conclusion

Again, ENE appreciates the opportunity to provide these comments and commends the Governor, Secretary and the Commonwealth's environmental, energy and transportation agencies for their thoughtful dedication to supporting a strong 2020 emissions target that sets us on the right long-term emissions pathway and commits the state to implementing the necessary polices to achieve it.

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[11] On July 15, 2009 the Maine Forest Service, ENE (Environment Northeast), and Manomet Center for Conservation Services submitted to the RGGI Staff Working Group ***A Policy Framework for Including Avoided Deforestation and Forest Management Practices as Forest Offset Types in the Regional Greenhouse Gas Initiative***, available at:
http://env-ne.org/resources/open/p/id/884/from/345
Massachusetts should lead RGGI in conducting a thorough review of the recommendation for a forest management offset project type and other relevant project types in order to demonstrate how the 5 part test could be applied to additional high priority offset project.

Global Warming Goals 2020 Petition

To: MA Executive Office of Energy and Environment

Given that the Commonwealth of Massachusetts is setting greenhouse gas emission targets for 2020 and accepting input on those goals up to July 15th 2010,
And given that even the committee set up to determine the appropriate greenhouse gas emissions levels has agreed that with foreseeable policy changes it would be reasonable for the Commonwealth to attain a 35% below 1990 level emissions level by 2020,
And given that the committee is also responsible for determining the strategies for reaching whatever the agreed upon emissions level is for 2020,
We, the undersigned, hereby expect and request that the Patrick Administration will commit to leading by adopting a target of 35% below 1990 levels for greenhouse gas emissions by 2020.
We expect and request that the Administration assess all strategies by planning backwards from an end goal of lifting our carbon footprint; this will avoid pushing more expensive changes to later years or creating redundancy or spending resources on dead end initiatives or taking steps that will increase barriers later (like making policy changes that exacerbate local resistance).
We further expect and request that the Governor's Administration will support policy goals that reflect the potential of already existing technologies for the State of Massachusetts such as:
* net-zero emission standards for new buildings,
* programming to attain an average of 50% weatherization and conservation measures for Massachusetts households
* prioritizing lower costs from the perspective of consumers as opposed to prioritizing the interests of major industry and electrical utility companies
• tying tax subsidies to savings for consumers and the creation of US – especially in-state – jobs with priority given to those communities where these are needed most
• setting the earliest possible goal for reaching 100% renewable electricity production which is already almost attainable with existing technologies.

Sincerely,

Alexander Volfson	Framingham, MA 01701
Ernest O. Edwards	Framingham, MA 01702
Sofia Wolman	01760
Marie-Louise Jackson-Miller	Quincy, MA 02169-5412
Grace Cherubino	Worcester, 01606
Peter H Smith	Newton, 02458
Kim McCoy	Worcester, 01606
Mike Heichman	Dorchester, MA 02125
Margaret Wykes	Shrewsbury, 01545
Danny Yoo	Worcester, MA 01609
Dorothy Emerson	02155
Ksenia Varlyguina	Boston, MA 02130
Elizabeth St. John	Worcester, 01602

Mary L Donnelly	01541
Judith Diamondstone	Worcester, MA 01602
Sandy Chan	02170
Emily Lewis	Amherst, MA 01002
Christopher Horton	Worcester, MA 01606
Guillaume Marceau	01609
Laura Williams	01420
Stephen Dunne	worcester, MA 01602
daniel sabatinelli	mendon, 01756
Julia Cohn	01604
Kristin Sherwood	Worcester, 01609
Steve Bornemeier	East Orleans, MA 02643
Nils Klinkenberg	Belmont, 02478
John DiCocco	Belmont, MA 02478
Lisa O'Connell	Boston, MA 02128
Robert Ross	Boston MA 02118
David Jay	Somerville, MA 02143
Nathaniel Putnam	Leominster, Ma 01453
Jenny O'Connell	Chestnut Hill 02467
Salvatore T. Tripoli III	Danvers MA 01923
Duncan Kenney	Brighton, 02135
Jeff Gang	Manchester-by-the-sea, MA 01944
Melissa Gabriel	02215
Heather Lyn MacKenzie	Worcester 01610
Maryann Alcala	02118
Linda Dube	Fitchburg, MA 01420
Hannah Hamavid	Somerville, 02143
Cathy Driscoll Clark	01462
Stephanie Lee	02115
Gillian Puttick	Somerville, 02144
Lily Ko	Quincy, 02170
Ethan Field	Somerville, MA 02143
Linnea Palmer Paton	Worcester 01609
Jessica Feldish	Boston, 02115
Laura O'Dwyer	20186
Dr. James K.L. Hammerman	Brookline, 02445
Grace C. Ross	Worcester, 01609

Set a Strong Emissions Reduction Target – emailed form letter

Sent individually via e-mail

Lee Dillard Adams
One Winter Street 6th Floor
Boston, MA 02108

Dear Dillard Adams,

Thank you for making Massachusetts a leader in tackling climate change by passing the Global Warming Solutions Act in 2008. As you are now implementing the act and deciding on the emission reduction target for 2020, I encourage you to:

* Adopt a 2020 emissions reduction target of 25 percent below 1990 levels. Massachusetts is well positioned to be a leader on this issue, demonstrating the potential of a concerted effort to drive technology and innovation to meet this ambitious emission reduction goal.

* Launch an initiative to dramatically reduce negative impacts of coal-fired electricity in the next decade by promoting clean alternatives such as energy efficiency, conservation and clean renewable energy.

* Start work now to put measures in place that will get us to the 80 percent reduction target by 2050. Developing ambitious measures now to reduce our dependence on fossil fuels and promote clean energy alternatives will help ensure that we reach our short and long-term emission reduction targets.

As illustrated by the Northeast Climate Impacts Assessment, organized by the Union of Concerned Scientists, global warming poses a serious threat to the economic well-being, public health, and natural resources of Massachusetts. Make Massachusetts a leader in meeting the climate challenge and supporting the shift to clean, renewable sources of energy.

Sincerely,

Dr. Revathi Ananthakrishnan, Cambridge, MA
Doris Berger, Brookline, MA
Carleton Bryant, Scituate, MA
Gib Chase, Northborough, MA
Dana Christofferson, Boston, MA
R. Wayne Crandlemere, Holbrook, MA
Dr. Eileen Entin, Lexington, MA
Peter Fried, Brighton, MA
Dr. Arthur Gionti, Amherst, MA
Dr. Miriam Leeser, Wellesley Hills, MA
Susannah Lerman, Amherst, MA
Dr. David Marcus, Somerville, MA
Dr. Judy McKinley Brewer, Amherst, MA
Jeanine Mindrum, Westborough, MA
Tegan Morton, Somerville, MA

Dr. Lynne Mullen, Somerville, MA
John Naugle, N. Falmouth, MA
Joyce Palmer Fortune, South Deerfield, MA
Robert Peterson, Cambridge, MA
Bob Schilling, South Deerfield, MA
George Schneider, Foxboro, MA
Daniel Scholten ,Carlisle, MA
Jean Sideris ,Somerville, MA
Mark Sentesy, Brookline, MA
Dr. Lawrence Spatz, Lanesboro, MA
Dr. Phyllis Troia, Plymouth, MA
Nancy Woolley, Stoughton, MA
Francis Worrell, Harwich, MA